

# THE IRON AGE

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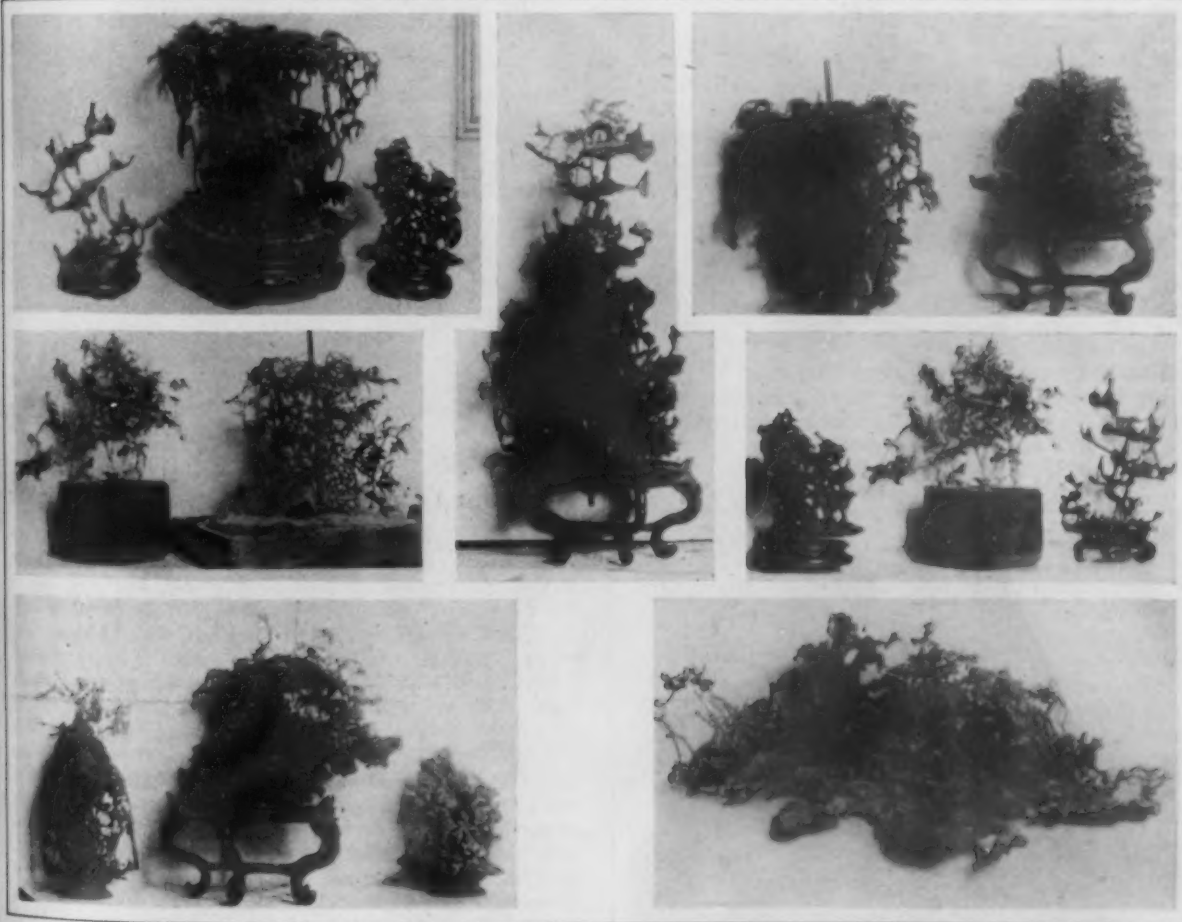
## A Puzzle in Intricate Iron Castings

An Inquiry for Suggestions How Gray Iron  
Could Be Formed in the Delicate Shapes  
Shown in the Accompanying Illustrations

The accompanying reproductions from photographs, slightly enlarged, show objects of common gray cast iron that look like delicate vines and low-growing ferns and in some cases suggest Japanese carvings. The specimens were produced by a metallurgical engineer and chemist, who found so much interest taken in them that he has sug-

gested at a time and sometimes respond to ordinary tremors in a room. Some of the formations are so delicate that they have been broken in somewhat careless handling.

Quite a number of guesses regarding the process or procedure have already been made but these are for the present withheld. In two or three weeks a sufficient num-



Specimens of Gray Cast Iron in Flower-Like and Other Delicate Forms. Attention is Called to the Resemblance of the Two Examples at the Upper Right Hand Corner to a Bunch of Grapes in the One Case and to a Growing Fern in the Other. The Specimen at the Lower Right Hand Corner Looks Not Unlike Low-Growing Ferns on a Stump of an Old Tree Showing Its Roots. The Left Side Specimen of the Group of Three Immediately Above this Last Has the Appearance of a Teakwood Carving

gested the presentation of the results in *The Iron Age* with a special invitation to its readers to offer their explanation of the procedure necessary to get such remarkable shapes.

Some of the tendrils, if they may be so called, are so fine and so springy that, if touched, they vibrate for min-

utes at a time and sometimes respond to ordinary tremors in a room. Some of the formations are so delicate that they have been broken in somewhat careless handling. Quite a number of guesses regarding the process or procedure have already been made but these are for the present withheld. In two or three weeks a sufficient num-

## Wire Drawing Block with Automatic Stop

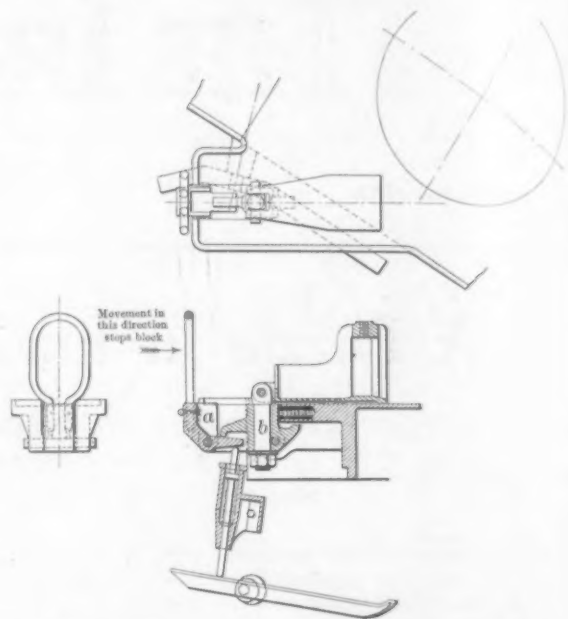
The Morgan Construction Company, Worcester, Mass., is equipping its coarse wire drawing blocks with automatic safety devices. The blocks built by this company are driven by individual friction clutches of the coil type located within the blocks and the take-up mechanism is designed so that a clutch may be released by applying but little weight on the stopping side of the foot treadle. Emphasis is laid upon the fact that the amount of force necessary to disengage the clutch is constant and is absolutely independent of the amount of work which is being performed.

The way in which the necessary motion is automatically imparted to the foot treadle in case of accident is brought out in the accompanying drawing. The safety loop through which the wire passes on its way to the die is pinned into a small steel bell crank, *a*, which moves around a fixed point. The horizontal arm of this casting rests upon the top of the plunger whose lower end when the machine is running bears against the stopping side of the foot treadle. In both this drawing and the engraving of the machine, the device is shown in the operating position. A kink, loop or tangle in the wire, irrespective of whether it has caught the arm or leg of the operator, must, of course, come up against the safety loop as it is drawn toward the die. A forward motion of the loop produces a downward motion of the horizontal arm of the steel crank and the plunger depresses the foot treadle slightly, breaking a toggle joint in the treadle mechanism and disengaging the clutch instantly. The stiffness of the device is determined by a spring which may be seen in the plunger housing and by choosing a spring of the proper stiffness the device can be made more or less sensitive, according to the requirements of the product.

Emphasis is laid upon the fact that the design of the stop is such that there is no way in which the parts can be cramped or thrown out of alignment by any unusual condition of the tangled wire. As its primary motion is a swiveling one around a fixed point, there is practically no chance for it to become jammed or obstructed by accumulations of dirt, as will be the case if the loop had a reciprocating motion. Another advantageous feature of the device is that its operation does not cut the wire, but stops the block and gives the operator a chance to straighten out the tangle and continue the draft, thus keeping a full weight bundle. The safety loop is employed frequently for stopping the block during the process of the draft to gauge and inspect the wire, or to split a bundle, it being more convenient for this purpose than the foot treadle.

Another safety device has been applied to the block and can be seen just below the rear end of the die box in the drawing. Its function is to stop the block instantly when the bundle runs out or the wire breaks, thus preventing the loose end of the wire from thrashing around, as it would if the block continued to revolve. Referring to the

drawing, it will be noticed that the die box, instead of being fastened directly to the top plate, is fastened to a steel casting, *b*, which swivels slightly about a fixed point



Drawing Showing the Principle of Operation of the Automatic and Safety Stop

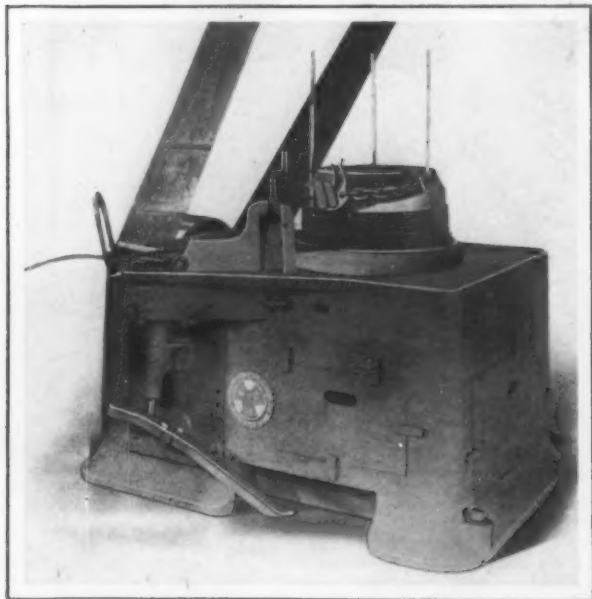
just below the die box. A hole drilled in the top plate, under the die box, contains a heavy compression spring which pushes against the casting above the pivot, and when the block is not running, causes the horizontally projecting arm to keep the safety plunger down. When wire is being drawn the pull on the die carries the box forward slightly, depressing this spring and allowing the plunger and treadle to assume their normal working positions. As soon as the die pull ceases, due to the finishing of the draft or the breaking of the wire, the spring, acting through this casting and depressing the safety plunger, causes the block to stop instantly. Another advantage of this device, apart from its value as a safety appliance, is its convenience. By its use it is not necessary for the wire drawer to stop his attendance upon other blocks and hurry to stop one where the draft has just finished.

As will be noticed from both the engraving and the drawing, the parts of these two safety devices are few in number and all are outside of the frame and always visible. Their construction, also, is substantial.

## An Enterprising Lehigh Valley Bar-Iron Maker

The Slatington Rolling Mills, Slatington, Pa., manufacturer of forging, engine bolt, and specification bar iron, has put in operation in the last month five new return tubular waste heat boilers above five of its puddling furnaces. These boilers, in combination with a large feed water heater injecting system, are found to be capable of producing enough steam to run the entire plant on waste heat. Although this rolling mill is of a limited capacity, it is claimed to be in a position to compare very favorably in manufacturing cost and efficiency with many of the larger mills that make good muck-bar iron. It is gratifying to note that this small mill has withstood the inroads of steel in the last decade, which speaks well for the company's efforts in keeping the question of quality paramount.

The management of the company has made some changes in the personnel of department heads, and has secured A. B. Olds, late of the Interstate Iron & Steel Company, East Chicago, Ind., as day superintendent, and E. C. Hamilton, late of the Nicetown Plate Washer Company, as night superintendent. J. R. Spencer has been appointed sales agent for the New England States.



A Vertical-Spindle Bull Frame Equipped with an Automatic Safety Stop

A Tropenas converter has been installed at the Norfolk Navy Yard, Norfolk, Va., for the purpose of producing steel castings. The foundry has heretofore made iron castings only.

# Economic and Commercial Situation in Peru

A Study, in View of the Use of the Panama Canal, of the Possibilities of Business Expansion  
—Power Development for Mining Operations

BY CHARLES M. PEPPER\*

LIMA, PERU, October 25, 1913.—Peru's economic and commercial life depends in a large degree on its mineral industry. The output of the mines shares with cotton, sugar, wool and rubber in forming the chief elements of the foreign commerce. The returns from the mines come back partly in the form of mining machinery and railway material and partly in general merchandise.

While through various reasons the city of Lima and the port of Callao are experiencing a period of dullness, the general conditions of the country are not bad. The leading mineral product is copper, and with an annual exportation of 25,000 tons to 27,000 tons at the prevailing prices, the mine owners have no reason to complain and do not.

If copper maintains its present level for another twelve months, Peru will get through the existing commercial and financial depression. Good prices for the agricultural products, cotton, sugar and wool, which are staple exports, also continue, and should more than offset the drop in the price of rubber. The rubber is produced in the distant Iquitos and Madre de Dios districts, and the depression does not seriously affect the local conditions on the Pacific coast.

Lima itself appears a quiet, fairly prosperous city of 140,000 inhabitants, with noticeable municipal improvements, especially in the suburbs. I have been an occasional visitor to the city within the last dozen years and never have found it looking so well as it does today. It is one of the most attractive places in South America, and the United States colony, which the mines and railways and general business have drawn here, is about as well contented as Americans ever are when they are settled permanently in a foreign land.

## The Rich Vanadium Mine at Present Quiescent

Recurring to mining conditions in their relation to business both here and abroad, passing note may be made of the fact that the American vanadium mine up in the heart of

the Cerro de Pasco district, which is said to be the richest vanadium mine in the world, is at present quiescent. Last year something more than 3000 tons were taken out of the mine and brought down to the coast for shipment. It is assumed that the present abundant supply in the States and in Europe and the moderate prices prevailing are responsible for the failure to continue shipments.

Whenever anyone doubts the mineral wealth of the Peruvian Andes he is told the story of this vanadium mine. Many of the natives of the Cerro de Pasco district had noted the deposits of what seemed to be an unusual mineral, but nobody guessed what they were. Finally the area was "denounced," as the Peruvian term is for

filing a claim, as coal. Under the Peruvian mining laws, coal claims can cover double the area of claims for other minerals. So it happened that the fortunate individual who filed the claim got double the area that he would under ordinary circumstances. Locally the vanadium is given the name of its discoverer and frequently appears under this name in railway and mining statistics.

## The Oroya Hydroelectric Development

The most important mining development in Peru since the Cerro de Pasco fields were acquired a dozen years ago by the American syndicate and railways built and smelters erected at a heavy expenditure of capital, is the

erection of the great hydroelectric plant at Oroya by the same company. Oroya formerly was the terminus of the Central Railway, which Henry Meiggs built in the face of stupendous engineering difficulties, and which I think is still the most remarkable railway in the world, both from its engineering features and from its majesty as a scenic line. It is 140 miles from the sea coast and lies in a cross canyon of the Andes. The Cerro de Pasco Company built its own line 50 miles north in order to secure rail transportation for the mines. The Peruvian Corporation, which operates the Peruvian railway system, has extended the main section to the south also, so that Oroya now is at the prong of two railway forks.

Engineers who from time to time have reported on



Grade on the Central Railroad in Peru

\*Second article on developments in the trade of the United States likely to follow the opening of the Panama Canal. The first dealing, more particularly with general South American and European activity in planning for commerce via the Panama Canal, appeared in *The Iron Age*, October 16.

the vast possibilities of the water-power of the Andes for electrical energy, always looked with favorable eyes on Oroya as a site for a central power-house. The Cerro de Pasco Company six or seven years ago made detailed studies and decided that they would provide an electrical installation at Oroya, but so much money had been spent in litigation, in the construction of the smelter and other works, and in experiments which did not prove successful that they were unwilling to incur fresh expenditures out of original capital, although it was demonstrated that the electrical installation in the economies which it would effect would pay for itself in two or three years. It is testimony to the earning capacity of the Cerro de Pasco properties that the amount necessary for the Oroya installation, said to be in the neighborhood of \$2,000,000, comes out of the earnings of the company. The plant will be in operation before the new year and will furnish 10,000 hp. This is the largest installation yet made by any of the mining companies. It is only a fraction, however, of the electrical energy that is latent in these Andean streams.

This year the exports are expected to be about the same. The exports of other metals are so small as to be negligible.

#### Mineral Oil Resources to Be Developed

Mineral oil is now receiving attention. The Standard Oil Company seems to have decided to enter the Peruvian oilfields possibly as a measure of self-protection. The present capacity of the district in northern Peru which is now under exploitation, the Talara, Lobitos and Negritas fields, is said to be about 200,000 tons annually, and the Standard is reported to have assured itself of at least one-half of this quantity. The demand of California for oil for refining is being met by the northern fields of Peru.

The consumption of fuel oil along the coast is increasing. The Central Railway for several years past has used oil-burning locomotives. The Southern Railway, operated by the same corporation, which runs from Mollendo up to Lake Titicaca and Cuzco, and which is the trade artery of



The Plaza of Palms and the Cathedral, Lima

The Oroya installation solves what was becoming a very important labor problem. The Cerro de Pasco mines are located more than 14,000 ft. above sea level. The native population at these altitudes is sparse. The natives of the sierras, or mountain districts, at lower altitudes, that is from 5000 ft. to 10,000 ft., experience almost as much difficulty in working at 14,000 feet as do those from sea level. It is this perennial problem of getting workmen for the mines in the upper altitudes, which in the view of many experienced operators has placed a serious limitation on the development of Peru's rich mineral resources.

#### Copper Ore Exports

Another limitation is the enormous cost of transportation. The Central Railway carries copper down to the seacoast at \$15 a ton, possibly for a little less for some of the biggest mines, which agree to furnish fixed quantities. The answer to complaints of high rates is the heavy cost of railway operation. These costs, however, can be reduced, and there is no question that ultimately new railway lines will be built, but capitalists who expect to operate as well as build the railways want to see a heavy tonnage in sight for a long series of years before they engage in enterprises, and even then they want liberal subsidies from the Government.

Copper, including the silver ores in matte, furnishes so large a proportion of the mineral exports of Peru that the figures are of interest. Last year the copper bars exported to the United States were valued approximately at \$7,000,000, and the copper ore and matte at \$3,500,000.

southern Peru and of a section of Bolivia, has decided to continue the use of coal. The difficulties of establishing a tank station at Mollendo is partly responsible for this decision. There is no harbor and the waters are so rough that tank steamers would have very great difficulties in unloading their cargoes. It was figured that the use of fuel oil would effect a saving of 25 per cent., but the company found that by the use of super-heaters and other economies it could import its coal from Australia and save 20 per cent. It therefore decided that an additional saving of 5 per cent. was not worth the risk.

The Peruvian Steamship Company, which, with the backing of the Peruvian Government, built a number of fast passenger and freight steamers in England and France for the traffic between Panama to Callao, after experimenting with oil as fuel on one of the steamers decided to change them all from coal burning to oil burning. This is now being done.

#### Working of Coal Fields Still Checked

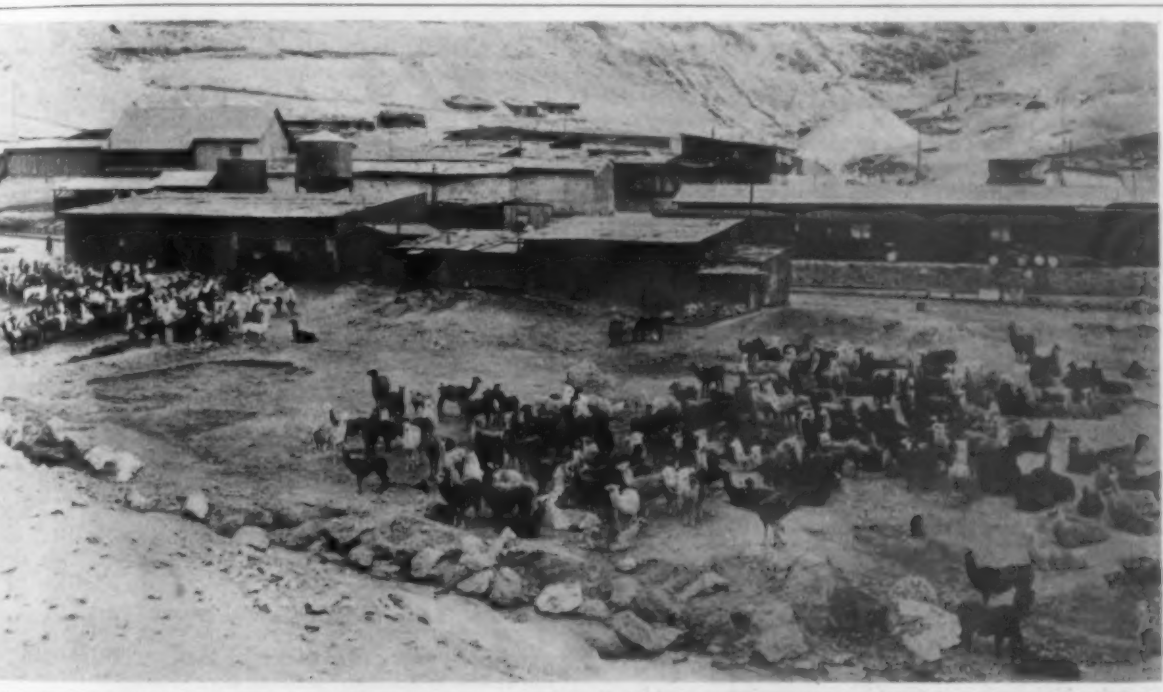
How far oil will supersede the use of coal is yet problematical, but with an abundant supply so readily available its utilization seems bound to be extended. Peru has plentiful coal deposits of its own, some of them anthracite and some bituminous. The heavy cost of providing transportation facilities heretofore has prevented the commercial exploitation of even the richest deposits with one exception. The Cerro de Pasco Company built a branch line to Gollarisquiza, about 30 miles in length, and opened the field there for its own purposes. The Central Railway

has uncovered some deposits along its line beyond Oroya, which it proposes to exploit for domestic purposes, but this is not likely to be on a large scale. The Government of Peru is now in negotiation with the mining companies of the Cerro de Pasco district to build a railway to some new coal fields which the engineers report to be extensive and commercially available. The Government proposes to contribute its share to the construction of the railway, but the railway proposition is an expensive one, and it is not likely to be carried through in the near future.

Anthracite deposits in northern Peru were acquired a quarter of a century ago by an American company which in the end was unable to raise the money needed for the inevitable railway, and therefore had to abandon its concession. The possibility of exploiting these anthracite fields has been revived by the reported intention of the Government to establish a military port at Chimbote, on the bay of Ferrol. Chimbote has the best harbor in Peru. From time to time tentative suggestions have been made as to its desirability as a coaling station for the United

States Navy, but the Navy has never asked the Government to acquire it. It will serve Peru as well as it would serve the United States, for it has great capabilities as a commercial port as well as a military port.

Henry Meiggs, in his grand schemes for the development of Peru, had a broad plan for irrigation as a means of attracting immigration and for a railway similar to the Central, and on the same magnificent scale of construction, regardless of expense. The railway from Chimbote has been creeping along to the interior, and in the course of years, with the active support of the Peruvian Government, it will unquestionably be prolonged to the Hualgayoc coal regions, but like the other railways which are necessary in order to render Peru's rich mineral deposits available, this is not a project for the immediate future.



Droves of Llamas, the Ore Carriers of the Andes, at Casapalca

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#### Nitrate Beds Not Considered Commercially Valuable

Two years ago it was thought that a new source of mineral wealth and of national revenue had been discovered in the existence of nitrate beds in Southern Peru. Preliminary reports were favorable, and the administration of President Leguia sent a special representative to the United States with a view to interesting American capital in their exploitation. If the nitrate was found to exist in the quantity supposed, it was proposed to exploit them as Government property through private companies, somewhat as is done by Chile, and to levy an export tax equal to the export tax levied by Chile. An American company engaged in the manufacture of explosives became interested and sent its own field engineers and experts to examine the deposits. A most thorough investigation was made, at

authentic information, this information being also of an official character.

#### Better Port Facilities Necessary for Peru

With reference to the Canal, Peru is preparing itself rather slowly for increased traffic. The main difficulty centers on the utterly inadequate shipping facilities of Callao. I should say from personal observation that they are worse now than they were five years ago, and that the port is unable to handle as large a volume of traffic as it handled even ten years ago. Complicated local and political matters intermixed with financial affairs partly account for this condition. It is to be said, however, that whenever measures are taken to improve the port facilities of Callao they are likely to be on an adequate scale. The Government has employed Jacob Kraus, the Dutch engineer, who planned the Valparaiso harbor works, to make a study of the proposed Callao port works. Some of his assistants are already here. After their examination has been made and their report submitted it will be for the Government to find the means of carrying out their recommendations, unless Callao, which means substantially all Peru, is to be left behind, not only by Valparaiso but by smaller ports. The Government is already aware that if it is to have the full benefit of the Panama Canal traffic it must provide facilities for 15,000-ton vessels. That is the type of vessel which Mr. Schwab proposes to put on for the ore transport of the Chilean mines which the Bethlehem Steel Company has acquired, and vessels of this type will not take cargo in and out of Callao until they can be given harbor accommodations.

### Peru's Foreign Trade Steadily Growing

The foreign trade of Peru, notwithstanding the present depression, which seems largely local, continues to grow at a satisfactory rate. In 1912 it was approximately \$63,000,000, the exports exceeding the imports by nearly \$10,000,000. This should give a comfortable balance to meet obligations and afford some encouragement to projects of national development.

Trade with the United States has grown in about the same proportion as that with European countries. With the opening of the Canal there should be a larger growth. It is the testimony of the heads of important commercial houses in Lima that American manufacturers are showing a better comprehension of the needs of the Peruvian market, though many individual manufacturers still have much to learn. While the great corporations which have established themselves here for the sale through their direct representatives of their products have been subjected to criticism, they have really opened the way for the small manufacturer and exporter who is operating either on his own account or through commission houses. They have made American wares and American quality better known and have established confidence in American goods generally. This in particular is true of iron and steel products.

The degree to which Peru is going to increase its purchases in the United States and elsewhere during the next two years is dependent partly on the success of President Billinghurst's administration in floating a new national loan. The Government wants about \$33,000,000, chiefly for the purpose of refunding previous loans, several of which were of a temporary character. If the loan can be floated it will enable a considerable saving to be made in the way of interest charges and will also permit some pressing obligations to be paid off. The condition of the money market in the United States and in Europe is held responsible for the failure up to this time to place the loan rather than lack of confidence in Peru's resources or her financial ability.

The budget which has been laid before Congress offers the inducement of economy in public affairs. The national revenues are estimated at \$17,000,000 and the current expenses at \$15,000,000. Substantially one-half the revenues comes from the customs. The balance is made up of various forms of internal taxation, including the alcohol and tobacco monopolies of the State. The export tax on rubber has been of some consequence as a means of revenue, but the returns from it will most likely diminish, since in order to meet the competition of rubber from the Malay Straits the Government may have to reduce the export duty, as Brazil and Bolivia already have done. It should not be assumed, however, that rubber production in Peru is going to cease. Like so many other crises of this character the present one is temporary.

### Much Depends on Effecting a National Loan

Should the proposed national loan ultimately be secured a portion of the proceeds will be used in railway construction, and this will mean the purchase of material and equipment in the United States. The railway policy of President Billinghurst's administration for the next year is a modest one, since the President does not believe that the condition of the country's finances justifies encouraging the more ambitious projects. His programme calls for \$2,000,000 to be spent mainly on extensions of existing lines. If this \$2,000,000 becomes available it will mean the expenditure of a larger sum next year and still larger sums as the national finances improve.

There is, of course, a political background to the national administration in Peru, just as there is in the United States. But here there is no question of the tariff or of a new banking law. The Peruvian tariff is not a burdensome one and offers no bar to the importation of foreign goods with possibly one exception. Native cotton mills have been established and encouraged by protective duties. Manchester has felt their competition and has lost the market for some of the coarser cotton fabric. The market of the United States for this class of goods was not large enough to be permanently affected.

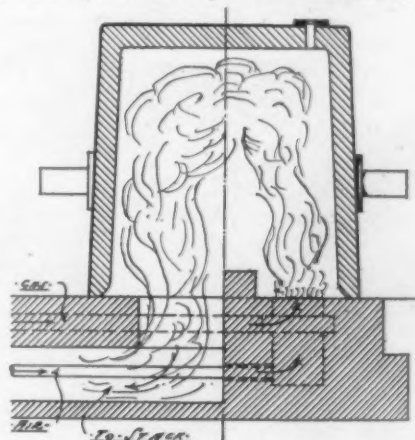
Peru's monetary system is the outcome of a period of national bankruptcy following the war with Chile in 1879-81. In the midst of internal political convulsions and international embarrassments, Peru went to the gold stand-

ard and has since maintained it. This financial stability is one of the factors that lessens the effects of temporary commercial and industrial depressions.

Relations with other South American countries have some influence on the investment of foreign capital, as well as on general business. The various South American republics usually have disputes pending with some of their neighbors, but Peru at this time seems to have fewer acute controversies than for many years past. The relations with Chile have improved greatly. A boundary controversy with Ecuador is causing anxiety, but before it reaches the breaking point the influence of the United States may be expected to be exerted for peace as it was exerted three years ago, when both Ecuador and Peru thought they ought to go to war over a disputed territory. A boundary commission is delimiting the frontiers between Peru and Bolivia, and that controversy is past the stage where it threatened the peace of South America.

### A New Method of Drying Ladles

A new ladle-drying apparatus which has been used by some large German steel works is the invention of E. Widekind, consulting engineer, Düsseldorf, Germany. The construction is simple, and it is claimed that with half the fuel cost it will heat ladles more gradually and thoroughly in half the time practicable by the old method of using a



New Ladle-Drying Apparatus Using Gas

wood fire under the over-turned ladle. A bright red heat can easily be obtained without excessive fuel consumption.

The apparatus will work equally well on coke, coal, oil or gas. The heating operation is performed by forcing air and gases of combustion into the mixing chamber underneath the ladle, which rests solidly with its entire rim surface on the heating furnace, as shown in the illustration, and the mixture of the moisture and products of combustion is drawn off to a stack outside in such a manner as to pre-heat both the gas and air on their way to the mixing chamber.

The effect of this arrangement is a gradual heating of the lining. While by the old method the heat rising up into the hollow of the inverted ladle interfered with the escape of moisture and gases, in the new device the water vapor is the first to be drawn off and goes up the stack. As the lining gets drier and hotter, the waste gases get hotter also and on their way to the stack these latter automatically raise the pre-heating temperature of the incoming air and gas, which in their turn produce a hotter flame at the burner. The length and volume of this are regulated by slide valves. The lining dried in so thorough and gradual a manner thus has a better chance to preserve its solidity. The waste heat may be utilized for other heating purposes.

The apparatus is claimed to be useful to open-hearth plants using ladles the size of which does not preclude their being turned over, as well as to steel foundries making medium-sized and small castings.

R. B. Charlton, general superintendent of the Milwaukee plant of the Illinois Steel Company, states that the new order limiting employees to six days per week will not affect his plant, as the rule has been in force there for many years.

## Vital Points in Good Foundry Practice\*

Factors Essential to Successful Management—A Radical Change in Conditions

BY J. J. WILSON†

In presenting a short paper on this subject I hope to impress on you some of the things we are apt to overlook and the aim is to bring out some discussion on ordinary foundry troubles. The scarcity of papers on the subject seems to indicate that most of us are loath to air our troubles before our associates. The following of such a course however would result in a benefit to the general welfare of our members.

### Three Important Essentials

The first essential to a successful foundryman is of course a thorough knowledge of the business. This is especially emphasized at the present time by the change in labor conditions from those existing 20 years ago to those confronting us today. Then skilled labor was commonplace; now it is the exception. The executives of the business are the mechanical brains, for, to use foreign labor now generally employed in foundries, patterns must be so constructed, and so many devices added to facilitate the molding that almost any illiterate foreigner can be taught to use them and produce good castings within a short time. Ability to judge the quality of raw material such as core and molding sands, and all of the smaller supplies is a most necessary requisite, for many times great losses hinge on mistaken judgment as to the suitability of the material used for the work in hand.

The second essential involves a thorough knowledge of the game we are playing in all of its branches, that is, a complete familiarity with the processes of the core room, the foundry proper, the mixing and melting of metal, and the cleaning, testing and inspection of the castings. This means that one must keep up to date with all the advances in foundry practice in general. It also means association with our neighbors and exchanging ideas with him; attending the conventions and taking advantage of the papers presented. In our line of work things change rapidly and the foundryman is now often called upon to judge of the practicability of a new design and a wide knowledge of modern methods is invaluable.

The third essential is a capable organization. The foreman and assistant foreman must be trained to handle the class of labor which is available. The qualifications of a modern foreman must be broader than formerly, for he must be a good teacher as well as an executive. The old time practices cannot be followed where molding machines are used with any success. Under present conditions patterns may be plated, gated, jar rammed, rolled and drawn by mechanical means, and if cores are to be set, jigs can often be devised for the locating so that the whole operation is almost fool proof and requires little more than a routine of simple operations easily taught the laborer. Such instances require but little instruction from the foreman, but they are the exception for usually they cannot be simplified to such an extent. The personal equation of the workman enters into the case materially. If the ramming be too soft the casting may swell, which, besides requiring more machining, may throw the locating points off to such an extent that it is only fit for the scrap pile. If rammed too hard we have other troubles in the shape of scabs and blows. If the bottom boards are not bedded properly we may have distorted castings. If gauges be required for setting cores, one must be sure that they are used and used properly. In short, it requires much patience and constant efforts to drum into the laborer the necessity for his following directions implicitly and paying strict attention to the small details.

### An Harmonious Organization

Such an organization as referred to above must have harmony between the foremen of all departments in order to secure the successful operation of each department. The superintendent by the use of a little diplomacy can often eradicate petty jealousy and lack of co-operation between department foremen and without the latter the balance sheet may be on the wrong side. A good executive will

not neglect these matters which may seem trivial but at the same time are all important in procuring the end in view—good castings and increased production.

The co-operation of the departments allied to the foundry, the pattern and machine shops, is essential. The need of the close proximity of the pattern shop is self-evident. Frequent consultation between the foundry and pattern shop on new designs is necessary before pattern equipment is made in order to arrive at the best and most economical method of production for the foundry. Unless this is done it frequently means that the pattern equipment must be entirely changed or made anew.

### A Good Cost System Necessary

I am positive from observation that some of the foundries do not maintain a good cost system. I believe in one. It can be effective though simple; a foundry should not take work from a customer at a loss. This has been done repeatedly in the past, and is being done now. Later the management wakes up to the fact; considerable business has been done but profits commensurate with the amount of business transacted are not forthcoming. Then perhaps follows reorganization or failure and a realization of the necessity of knowing certain essentials. The standard cost system, recommended by the American Foundrymen's Association a few years ago, I have found to be very effective and simple and applicable to any foundry. In short, a cost system should not be so elaborate that it will cost more to maintain it than the profits will amount to.

The final factor essential to the reputation of the foundryman is that he should aim for *quality*, and to get this, rigid methods of inspection and testing of castings are necessary. A reputation for quality will often get business at a higher price than the foundry producing mediocre work at a lower price. That is to say, if the foundryman were to forget the matter of profit for a time and give his entire attention to raising the quality of his product, he would soon find that he would reap the benefits of his seeming sacrifices in that he would have all the work he desired at his own price.

### Philadelphia Foundrymen's Association

A large number of foundrymen, particularly those interested in the manufacture of steel castings, attended the regular monthly meeting of the Philadelphia Foundrymen's Association, held at the Hotel Walton, in that city, on the evening of November 5. A paper on "The Wills Combination Steel Furnace" was read by E. Cooper Wills, superintendent of the foundries of the Morris Iron & Steel Company, Frederick, Md. The paper was illustrated with a number of lantern slides, showing views of the furnace which has been in operation at the company's plant.

The Wills furnace is designed for use as either an open-hearth, side-blow converter or electric furnace. It is of the rotary type and is claimed by the inventor to be economical in operation. Oil fuel is used, and the control of the various mechanical operations is electrical. By the Wills process, the metal to be refined is first melted in a cupola, then transferred to the rotary type furnace for either open-hearth or side-blow refinement. Heats of various sizes are permissible. Mr. Wills stated that the several heats which have been run in the new furnace produced steel of high grade and exceptionally fluid, and that the resulting castings were clean and solid.

Following the reading of the paper a luncheon was served, and brief addresses made by Thomas Devlin, Howard Evans, E. H. Jamison, H. O. Evans and others.

A process by which steel is hardened by means of compressed air is now in use by a German firm in cases where only certain parts of the metal require hardening, according to Compressed Air. The customary methods of hardening by chilling the steel in water, oil, or special baths is not satisfactory in such cases, owing to the tension created between the hardened and unhardened portions of the treated metal. In the new procedure the compressed air is sprayed over the metal through specially designed nozzles, by means of which, by varying the number and spacing the openings, the degree of hardening may be accurately graded.

\*Paper read before the American Foundrymen's Association, Chicago.

†Vice-president American Foundrymen's Association, Cadillac Motor Car Company, Detroit.

## The Care of Steel Mill Rolls

Storage and Turning Shop of the American Bridge Company, Pencoyd, Pa.

Supplementing the paper before the American Iron and Steel Institute by T. H. Mathias, assistant general superintendent of the Lackawanna Steel Company, Buffalo, N. Y., printed in *The Iron Age* of October 30 and November 6, may be presented the accompanying reproduction of two photographs showing the roll storage and the roll turning shop of the Pencoyd plant of the American Bridge Company. These photographs were obtained from Henry L. James, superintendent roll department, American Bridge Company, Pencoyd, Pa., whose discussion of Mr. Mathias's paper was given in the issue of November 6.

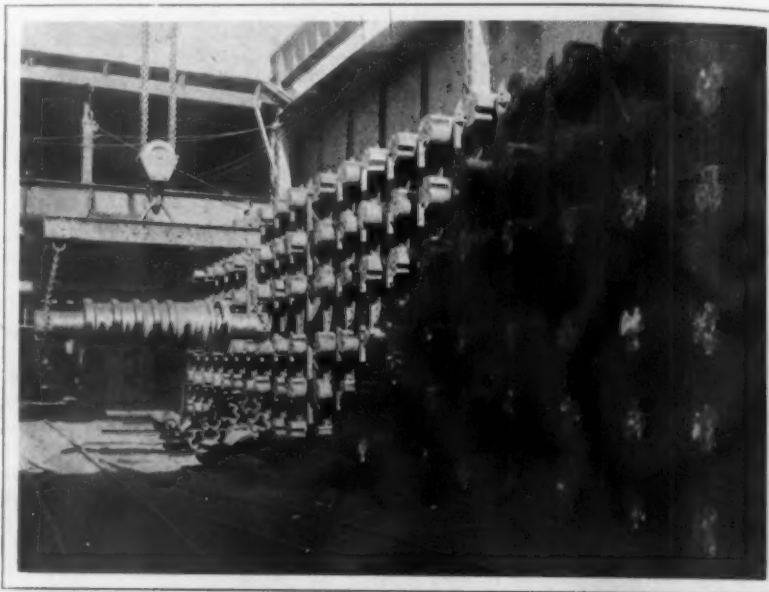
Respecting the roll shop, it should be mentioned that the lathes have an endless chain underneath to pull the turnings out to the charging box, saving in re-handling them. The lathes are motor driven. Guides are fitted to the rolls in the roll shop to insure perfect fit and thus to minimize or eliminate delay in the rolling mill. The rolls weigh 12,000 lb. each and the picture of the roll storage shows the number one can get in a small space. Each roll is separated from the others, which is found a good arrangement to prevent injury to the rolls.

In contrasting roll design as it is today and as it formerly was, Mr. James writes as follows: "In the early days of rolling, much was guess-

as the shapes would not do for the next section to be rolled. Now, we have duplicate rolls all fitted up in extra housings, ready to lift over to the mill, cutting the delay down to a mere trifle.

"The present endeavor to produce a perfect section in as few passes as possible has led to a more daring use of the method of ragging the rolls without injury to the bar or causing laps that will show in the finished section.

"The more perfect the equipment, the better the service, and so it would seem that a knowledge of the mills, an understanding of the furnaces and heating of bars, ability to run the lathe and turn the rolls, a mechanical drawing-



Storing Rolls So They Do Not Touch One Another



Roll Turning Shop of the American Bridge Company, Pencoyd, Pa.

work, with dire results, as rolls would go in the mills many times before they would work, causing losses of time and money, but each failure was an experience by which roll designing has grown to where we find it today. In previous years, the breaking of a roll meant hours of delay, pulling shapes and billets from the furnace and recharging,

room experience, an eye open to the percentages of waste, which can be decreased by skillful roll designing, and, above all, a personal supervision of the rolls, make the all-around designer of today. As we look back to the pioneers, we are aroused to pay tribute to those who, by experience, taught us the principles of our business."

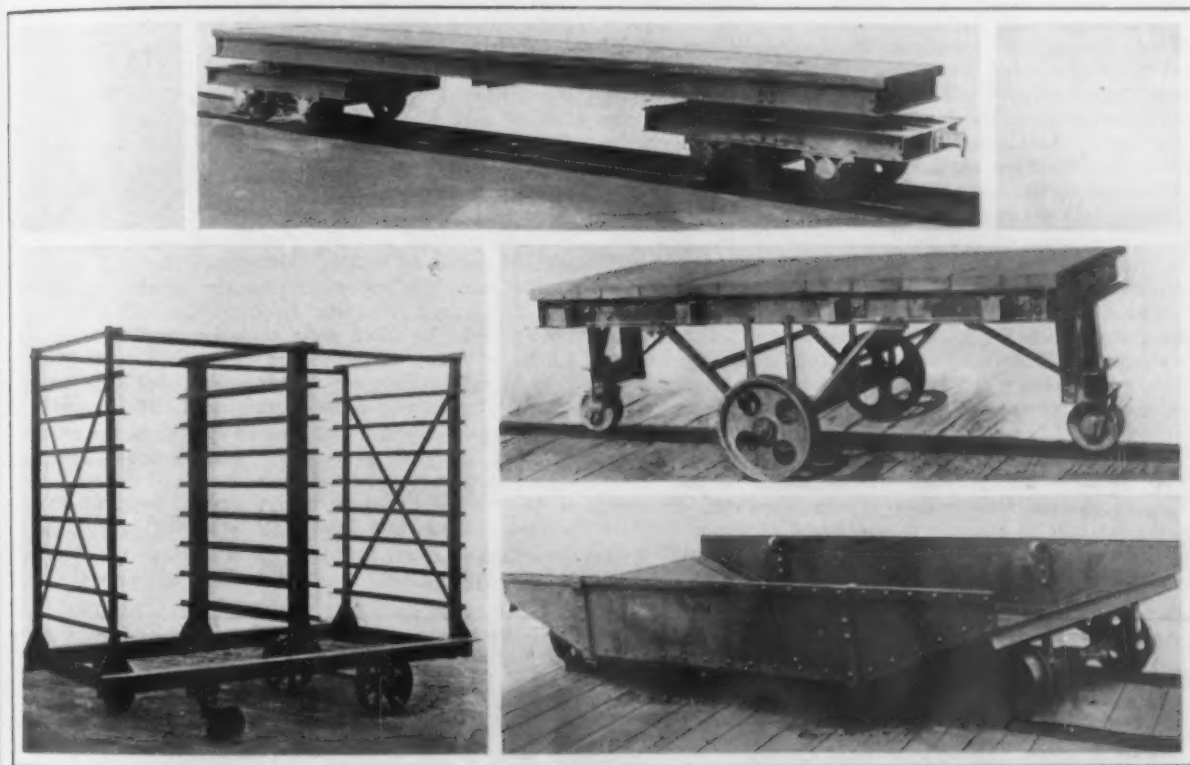
## Four New Cars for Industrial Plant Use

Some Interesting Special Types Designed to Meet Particular Conditions

For the economical transportation of material in industrial and power plants, the Orenstein-Arthur-Koppel Company, Pittsburgh, Pa., has developed a number of types of special cars. Four of the most recent which are used for handling widely different kinds of materials are illustrated herewith. The one at the top of the accompanying group of engravings was designed for handling long pieces around short curves. That at the left is intended for the product of automatic machines which has to be placed on trays for drying or for the output of the machines needed to be transferred directly to the packing room. At the upper right is a combined track and car which can be used in all portions of a plant and yet does not require a large

It is pointed out that this type is well adapted for the economic handling of any material which is turned out automatically by machines and placed on trays. These cars have one fixed axle with two large flat faced wheels, and at the opposite end there are two caster wheels, so that the car will turn in a small radius. This car will accommodate 16 sets of trays and is 71 in. long and 35 in. wide. The height is 59½ in.

A large nut and bolt company required trucks that could be run to any point on the factory floor. It was desired to reduce the amount of power needed for making long runs between points in the same building or between different buildings of the plant. A truck was designed in which two large wheels with a flat tread are placed at the center of the car and one caster wheel at each end, which casters are higher from the floor than the larger wheels. When the truck is being pushed around on the floor, it acts like one of the ordinary caster wheel type, but the



Special Car for Handling Long Pieces

A Tray Car for Use Between Automatic Machines and Packing Rooms

A Combined Car and Track. An Ash Handling Car for Power Plants

FOUR RECENTLY DEVELOPED TYPES OF CARS FOR THE HANDLING OF MATERIAL IN INDUSTRIAL AND POWER PLANTS

amount of power for long runs, and directly underneath this is a car for handling ashes, as in a boiler plant.

In lumber mills or manufacturing plants, for carrying materials from one place to another, it is generally considered necessary to install the industrial railway track with curves of very small radii. If the material being handled consists of long pieces such as steel bars, sheets or lumber, it is necessary to use a correspondingly long car, mounted on double trucks to give it the proper support and at the same time permit it to run around the small radii curves on the track, it being necessary in some cases to provide radial drawbars, so that the cars can remain coupled while passing around the curve. With a view to overcoming the need for these special drawbars, the Orenstein-Arthur-Koppel Company has designed a car, largely for a lumber company in Mexico, in which the trucks are built to extend beyond the end of the platform. The coupler is fastened directly to the truck frame instead of to the body. As the trucks, of necessity, always face in the same direction as the track, it is possible to use a simple coupler, even with small radii curves in the trackage.

Another type of car handling a number of trays has been designed for use in a large soap and chemical compound plant. This car is a development of the rack car that has been used for some time in brick and tile plants.

caster wheels are flanged to fit over the head of a rail. A single rail has been installed, and when the truck is to travel for a long distance it is run on the rail and placed so that the grooves in the small wheels fit over the rail head. In this way it is pointed out that one man can push the truck easily without having to waste any of his effort in guiding it, and at the same time an efficient means of handling material has been secured.

The Calumet & Hecla Copper Mining Company has recently made a number of extensive improvements in its power plant and one of these includes the handling of the ashes directly from the pit without having to rake them out and then shovel them into cars or wheel barrows. The car was designed to run directly underneath the boiler grate and receive the ashes. The filled car can be run to the ash dump outside the boiler house, or it can be lifted by a crane and dumped directly into a standard-gauge car for removal. The body of this car is made of 3/16-in. plate, with reinforcing to prevent warping due to the heat of the load. The wheels of the car are of cast steel with roller bearings in the hubs. The car is very low, the height being only 24 in. It is 12 ft. long and 65½ in. wide, being designed to run on a track having a gauge of 36 in. The capacity of the car is approximately 95 cu. ft., and it is stated that the use of these cars has caused a great reduc-

tion in the amount of labor in the boiler room, as well as saving the inconveniences and time lost in having the ashes pulled out on the boiler room floor with the dust and dirt accompanying this method of handling.

### A New Corbin Company

The American Hardware Corporation, New Britain, Conn., announces that, in accordance with the Corbin policy to segregate any portion of the business when its proportions or vitality makes it evident that a separate organization can best care for its needs, the Corbin Automatic Products Company will be created to take over January 1 the portion of the Corbin Screw Corporation's activities which have been devoted to the coaster brake, the speedometer and the manufacture of special parts. Clarence A. Earl will be made the manager of this new division of the business, and Charles Glover will assume direct charge of the Corbin Screw Corporation and its manufacture of screws, bolts and kindred articles.

The change will permit the concentration of the Corbin Screw Corporation's energies to the production of the goods which formed the basis of its business in the beginning, and in which the problems of manufacture and sale are different from those in other lines, and it affords the new Corbin Automatic Products Company an opportunity for development and expansion in the manner best adapted to its growing needs and the trend of the trade. The new company will assume charge of the buildings now devoted to the production of the goods it will handle and of a new six-story building which is being erected, giving a largely increased productive capacity.

There will be no change in the policy or general methods under which the business is now done. The change is simply made in the interests of better service to the trade and a closer application of individual treatment to the manufacturing and sale problems involved.

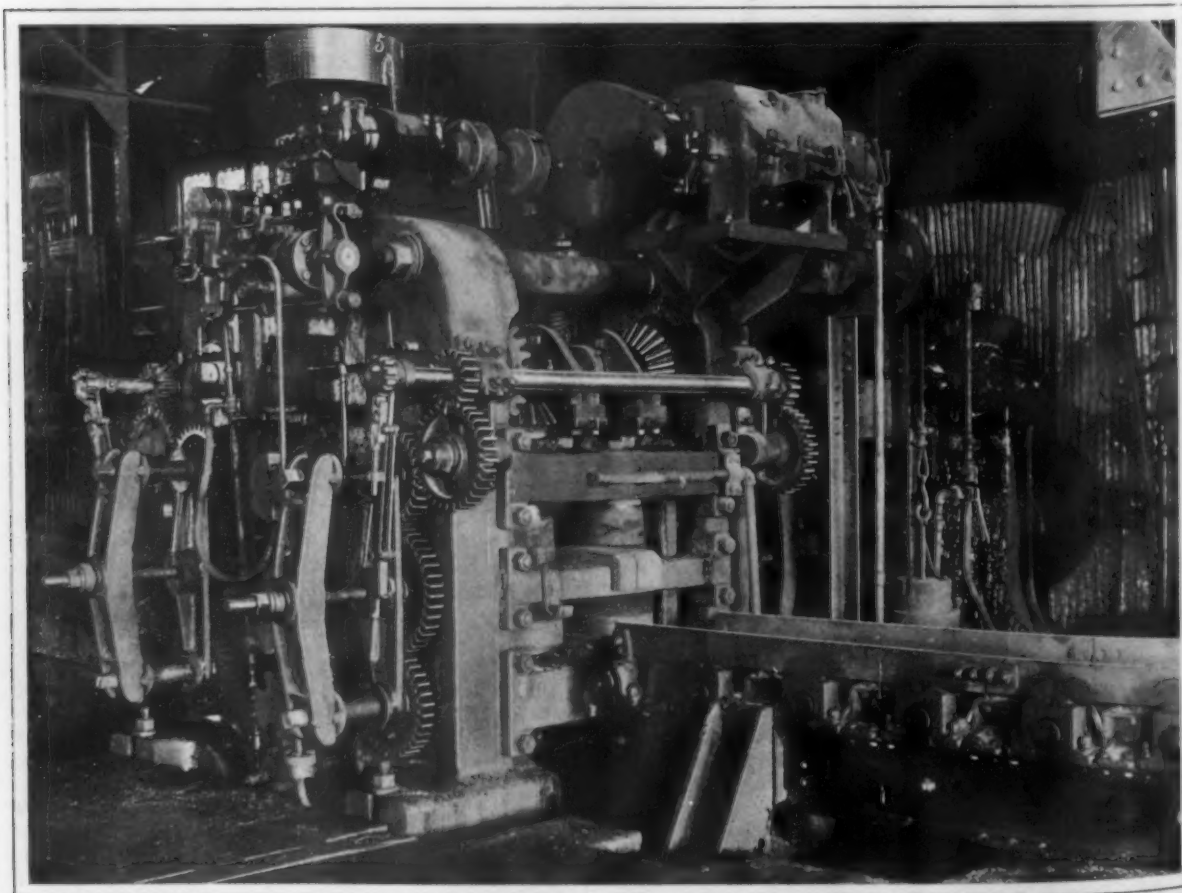
The Galion Iron Works & Mfg. Company, Galion, Ohio, recently incorporated, was organized to take over the plant of the Galion Iron Works Company. Because of the increase in business it was found necessary to provide more capital and the new company was formed with a capital stock of \$1,000,000.

### A Three-High Universal Plate Mill

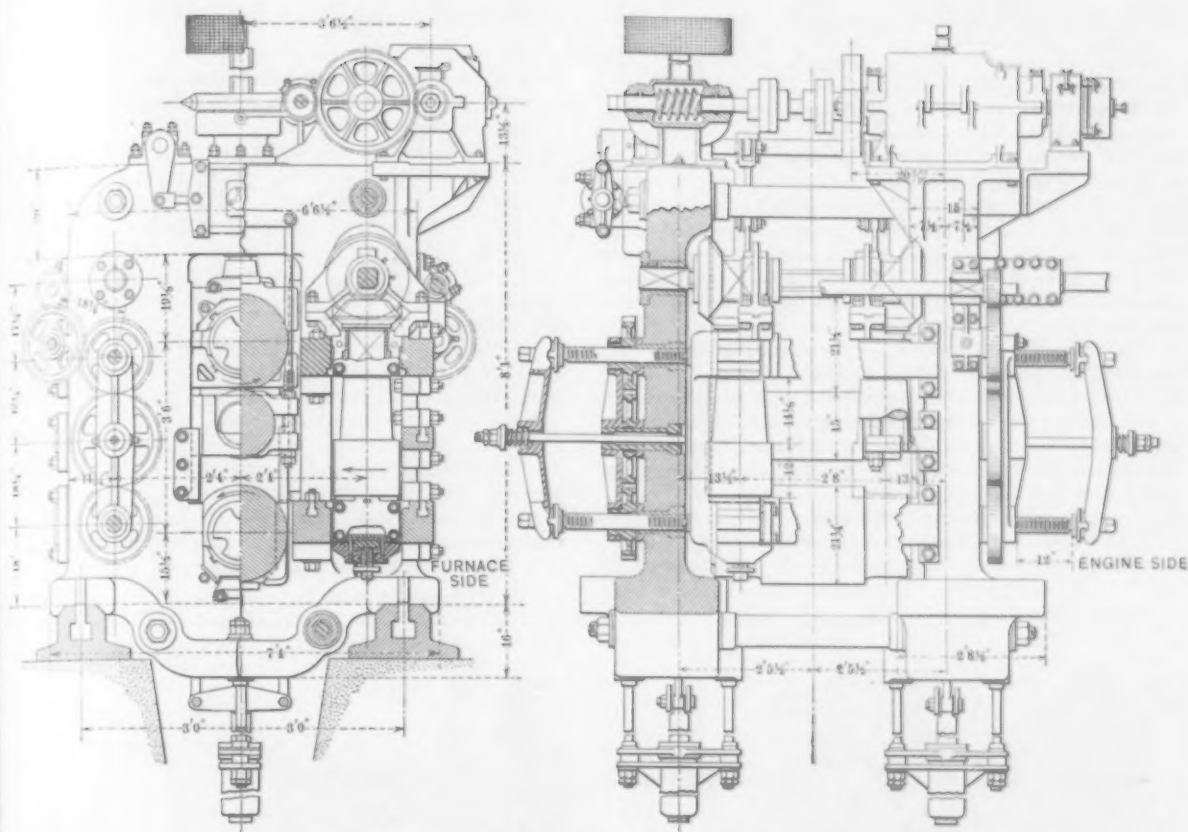
Plates Rolled from 4 to 18 In.  
Wide and as Thin as No. 15 Gauge

The Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa., has recently designed and built a new three-high 21-in. universal mill for its rolling mill department. It was decided to build this mill, which takes the place of an old 20-in. grooved mill, in the early part of June this year, and the first slab delivered to the mill on September 29 was successfully rolled to width and gauge. From the standpoints both of time and successful operation this feat is somewhat remarkable, when the limited facilities of the company, both in the engineering department and the shops, for doing work of this character are taken into consideration. The capacity of the mill is plates from 4 to 18 in. in width, having a minimum thickness of 0.072 in., which corresponds to No. 15 gauge.

Very heavy construction characterizes the mill, all of the parts having been made over size wherever possible. The housings are made of air furnace iron and are heavy to give the mill rigidity. The boxes and practically all of the fillings are made of steel and all the bearings are bushed with a view to facilitating the making of repairs. The bearings for the middle roll are readily removable from the outside, and the employment of a special balancing apparatus permits the roll to be removed and another one substituted in a very short time. This feature of rapid removal was also considered in the design of the vertical rolls. In making this change the bonnets are removed from the yokes carrying the bevel gears and the rest bars taken from the front of the mill, after which the rolls can be taken from their housings and new ones put in. Special attention has been paid to the bottom vertical roll bearing, which it is pointed out occasions considerable trouble in mills of this type. The extension of the bronze bushing into a groove turned in the roll body is relied upon to protect the bearing from water and scale. A hole running the entire length of the vertical roll at its center is designed to give positive lubrication to the bottom bearing, and it is stated that an examination of the vertical rolls and their bearings after five weeks' service showed such a small amount of wear that it is



View of a Recently Developed Three-High 21-In. Universal Plate Mill



Cross-Sectional Elevations of the Harrisburg Three-High Universal Plate Mill

expected they will last several months before it becomes necessary to remove them from the mill. The working body of the vertical roll is  $14\frac{1}{2}$  in. in diameter and the neck is 8 in. in diameter.

The diameter of the main rolls is  $21\frac{1}{4}$  in., and the necks are 14 in., a design which tends to give a rigid roll by reason of the shortness of the working body, the length being only 23 in. Two hydraulic cylinders under the top roll housings balance it in the customary way, while the middle roll is lifted by a cylinder located on the side of the housing where it is readily accessible for packing and making the necessary adjustments. For leveling the mill and turning out straight material, the top and bottom main rolls have wedges. By reason of the small amount of adjustment required on the vertical rolls, ratchets are provided to move them in and out, although it is possible to apply motors at any time, if the occasion should arise.

The screw-down on this mill is somewhat faster than is called for in ordinary practice, a 35-hp. Westinghouse mill motor being connected to the screws through a worm and worm gear having a ratio of 16 to 1. General Electric magnetic switch control and a brake built by the Electric Controller & Mfg. Company are employed to operate the motor. Emphasis is laid upon the fact that with this control apparatus the production of the mill is not limited or retarded by the screwman, but is governed only by the speed of the rolls and the ability of the table runner to supply bars and remove the finished product.

This mill is operated in conjunction with a three-high bull head stand, which serves as a finisher. The construction of this stand is also rigid, and it is possible to obtain three reductions on it, thus reducing the plate or bar to half its thickness. When the two mills are operated in conjunction, one as a rougher and the other as a finisher, light gauges can be rolled and material accurately finished to gauge and with a surface free from scale and other defects is secured. It is possible to ship the output of these mills either in lengths cut to order or in coils, as the customer may require, the necessary equipment having been installed.

The slabs rolled in this mill are of basic open-hearth steel, with a maximum sulphur and phosphorus content of 0.03 per cent. As these are made in small furnaces having a capacity of but 40 tons from selected pig iron and scrap, it is pointed out that the product of the mill is particularly adapted for stamping, deep drawing and cold

rolling processes, or for any work where a steel of accurate analysis and great uniformity is required.

### Tate-Jones Furnaces for Panama Foundry

Tate, Jones & Co., Inc., Pittsburgh, have furnished the furnace equipment for the new Government foundry at Balboa, Canal Zone. This equipment comprises an oil-burning furnace for annealing various sizes and kinds of steel castings; an oil-burning furnace for drying molds for steel castings; four oil-burning ovens, of which one is used for drying large cores for steel, iron and brass castings, and three for drying smaller cores.

The annealing furnace is 18 ft. 9 in. long and 15 ft. 6 in. high. It is provided with an all-steel car and track, the latter extending 24 ft. into the shop. This furnace and its equipment are capable of handling castings up to 15 tons in total weight. The mold-drying furnace is 18 ft. 5 in. wide, 27 ft. 6 in. long and 12 ft. 6 in. in extreme height, and is provided with double tracks and with cars or trucks for transporting all sizes of flasks up to 15 tons. The largest of the core ovens is 12 ft. 6 in. wide, 18 ft. 8 in. long and 10 ft. 8 in. high and is provided with removable shelves 18 in. wide, spaced 24 in. apart, also being equipped with track and cars. Each of the three smaller ovens is about 3 ft. wide, 4 ft. long and 6 ft. high, and all are equipped with shelves of the revolving type.

The annealing furnace is provided with 6 burners, the mold-drying oven with 3, the large core oven with 2 and each small core oven with 1. These burners use either air or steam at 85 to 100 lb. pressure per sq. in., for atomizing the oil and air, at 4 to 6 oz. pressure per sq. in. for combustion.

According to the London Iron and Coal Trades Review, it appears that the manufacture of steel by the electric process is progressing steadily in France. From 13,445 tons in 1910 and 13,850 tons in 1911, the output increased to 15,922 tons in 1912. The region of the Alps produces about 10,000 tons of this total. These figures compare as follows with those of Germany and Austria: Germany, 36,188 tons in 1910 and 74,075 tons in 1912; Austria, 19,891 tons in 1912, against 22,870 tons in 1911.

## New Design Double-Spindle Engine Lathe

J. J. McCabe, 30 Church street, New York City, has made several improvements in the double-spindle lathe which in its original form was illustrated in *The Iron Age*, March 8, 1906. Among the changes are a new design of bed, the use of semi-steel for the face plate and the use of drop forged steel gears in the apron in place of cast gears. The lathe is designed for general repair shop work. For street railway repair shops a new wheel holding attachment and a new wheel turning rest, with a universal tool post, have also been added. A view of the lathe, arranged for turning carwheels, is presented in the accompanying engraving.

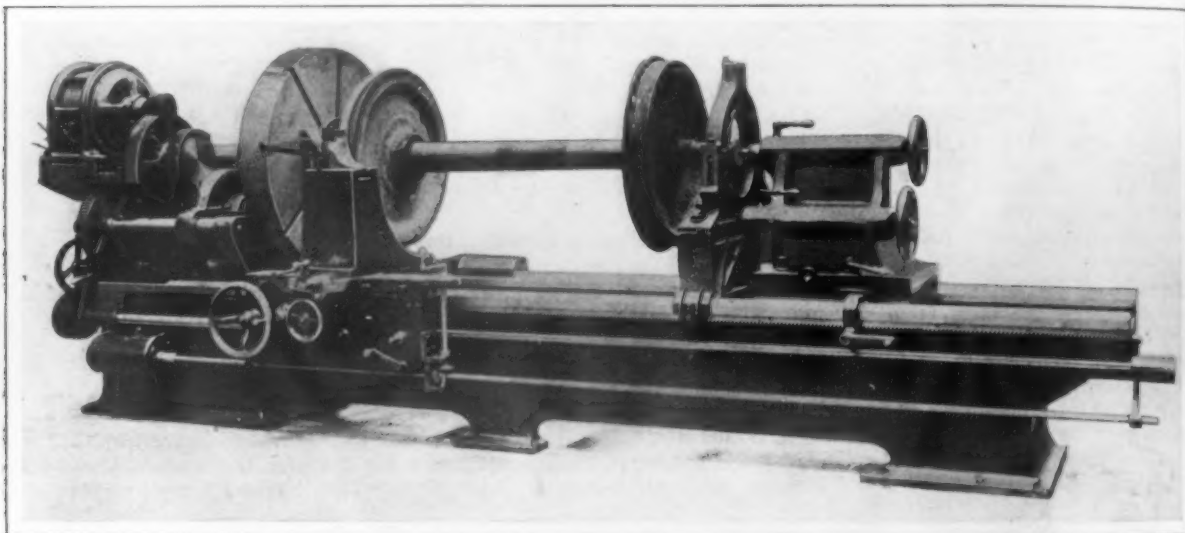
The bed now extends to the floor and has been made heavier. The internal geared face plate which provides a ratio of 72 to 1 is made of semi-steel. Drop forged steel is employed for the apron gearing, some of which was formerly cast. The diameters of the spindle and steady rest have been increased and a number of other conveniences have been added.

To adapt the lathe for turning carwheels, a new wheel holding attachment with a semi-steel driver arm socket plate and a three-piece bushing to fit the axle journal has

## Chrome-Vanadium Rolled Steel Wheels

The Grand Trunk Railroad recently ordered 400 heat-treated chrome-vanadium rolled steel wheels for the tenders of 50 Mikado type locomotives under construction at the Montreal Locomotive Works. The tenders have a capacity of 9000 gal. of water and 15 tons of coal, making a full load of 172,000 lb., or an average load of 21,500 lb. per wheel. These wheels have been made by the Standard Steel Works Company and the Carnegie Steel Company, and some of them have been submitted to severe drop tests as well as to the usual physical and chemical examinations—the first tests of this character made on such wheels.

In the drop tests made by the Carnegie Company, the anvil of the drop testing machine consisted of a heavy steel circular block recessed in the center for the reception of the hub, so that the wheel was supported on the rim. The anvil in turn rested on a solid wheel base, making an absolutely rigid foundation. The tup, which weighed 2000 lb., was guided between two uprights ensuring a square blow. Two wheels were selected at random for test, one from each of two different heats. The first wheel, from heat 15,476, was first placed with the



The New Redesigned Double-Spindle Engine Lathe in Use for Turning Carwheels

been added. With this attachment the machine is regarded as capable of gripping any style of wheel mounted on an axle, whether the motor gear is removed or not. The new wheel turning rest, which is shown in the cut, has a universal tool post for holding the tool while the wheels are being turned, an exclusive feature, it is stated, on this lathe.

As illustrated, the lathe is driven by an alternating-current multi-speed motor, designed to give four speeds of 600, 900, 1200 and 1800 r.p.m., but of course direct-current motors can be used. A drum type controller is used.

## Charles E. Hildreth, General Manager Machine Tool Builders

James H. Herron has tendered his resignation as general manager of the National Machine Tool Builders' Association, to take effect January 1, and the executive board has elected Charles E. Hildreth, Worcester, Mass., to fill the office. Mr. Hildreth is associated with the Whitcomb-Blaisdell Machine Tool Company, Worcester, and was formerly secretary of the association, in the days before a general manager was employed. His work, consequently, was similar to that which he will be called upon to perform in his new office. His successful administration will be remembered by the members. His effort to increase the membership at the time resulted in most important results, bringing it to a high percentage of the total of the industry in this country. Mr. Herron resigns because of the pressure of his business as metallurgist.

concave face of the plate up, or in a position in which it offered the least resistance to side thrust. In this position it was subjected to two blows at 10 ft. and 25 blows at 16 ft. equivalent to 840,000 ft.-lb. without crack or fracture. The total deflection of the hub was  $\frac{1}{4}$  in. The wheel was then reversed with the convex side of the plate up and subjected to five blows from a height of 16 ft. before it broke. The total deflection of the plate was  $\frac{5}{16}$  in. The wheel thus withstood a total of 1,000,000 ft.-lb. before cracking or breaking. The second wheel, from heat 15,479, was tested in the same manner except that all the blows were delivered from a height of 16 ft. In this case the total energy expended to break the wheel was 806,000 ft.-lb. Similar tests, made by the Standard Steel Works Company on their wheels, showed an expenditure of 1,254,000 ft.-lb. before cracking or breaking. The fractured steel showed a tough crinkly structure.

Physical tests made from various portions of the broken wheels by the American Vanadium Company showed the tensile strength to vary from 118,000 to 130,000 lb. per sq. in. with an elastic limit approximating 70 to 80 per cent. of the tensile strength. The chemical composition was normal, the chromium and vanadium content averaging about 1 per cent. and 0.16 to 0.25 per cent. respectively, with the carbon varying from 0.55 to 0.65 per cent.

Hardness tests made on both sets of wheels by the Brinell and scleroscope methods showed a practically uniform hardness throughout the entire section, the scleroscope hardness being 44 to well below the limit of wear line, with an average Brinell hardness of 286, as made on the Carnegie wheels.

## Investigation of a Broken German Car Axle

Defect Due to Improper Heat Treatment  
— Various Effects of Proper Annealing

In *Stahl und Eisen* for September 4, the results of an investigation of a broken car axle are given. The break was at the inner side of one wheel, and showed an old fracture at one side 3 in. long and extending in 0.63 in. The axle was 5.12 in. in diameter, and had been made for about 20 years. The structure of the steel is clearly shown in Fig. 1, taken transversely to the direction of rolling. The ferrite and pearlite are arranged in parallel bands, the former containing numerous slag inclusions. The pearlite is in large crystals and is well laminated. It is evident that the axle was rolled at a high temperature, and cooled very slowly. Present day German requirements were evidently not followed, for they provide that the axle must only be rolled to double the diameter desired and the further work done by forging.

To show the effect of this coarse structure, comparative tests were carried out on the steel after annealing at 850 deg. C. for half an hour, and cooling in air, and also on a similar steel axle properly rolled and forged to the finished shape. The structure of the annealed steel and of the forged axle is shown in Figs. 2 and 3. Annealing has completely broken up the parallel structure, though several

## New Source of Radium Supply

Some time ago the Crucible Steel Company of America, Pittsburgh, Pa., the largest manufacturer in the world of high-speed tool steel, with plants located in different parts of the United States, because of the fact that up to this time vanadium ores, from which the company secured some of the rarer metals used in its product, were found almost exclusively in South America, determined to make every effort to find a source of supply nearer home. It therefore sent engineers to Colorado to investigate, with the object of purchasing the land if vanadium ores were found. They developed a considerable territory in Paradox Valley, southwestern Colorado, and the claims were then purchased by the Crucible Steel Company. On further investigation the property was proved to contain not alone a large tonnage of vanadium but also of uranium ore from which radium is produced. It is stated to be the richest radium bearing field in the world.

It is well known that up to this time there have been but two sources of supply of radium in the world, both from pitchblende residues, namely, a small supply found in Colorado and that obtained in Joachimsthal, Austria, the exportation of which latter radioactive ore the Austrian Government has prohibited. A gram of pure metallic radium is worth about \$120,000. The present chief holder of radium in the world is Madame Curie, of Paris, who has between 2.6 and 3 grams. The Radium Institute of Lon-

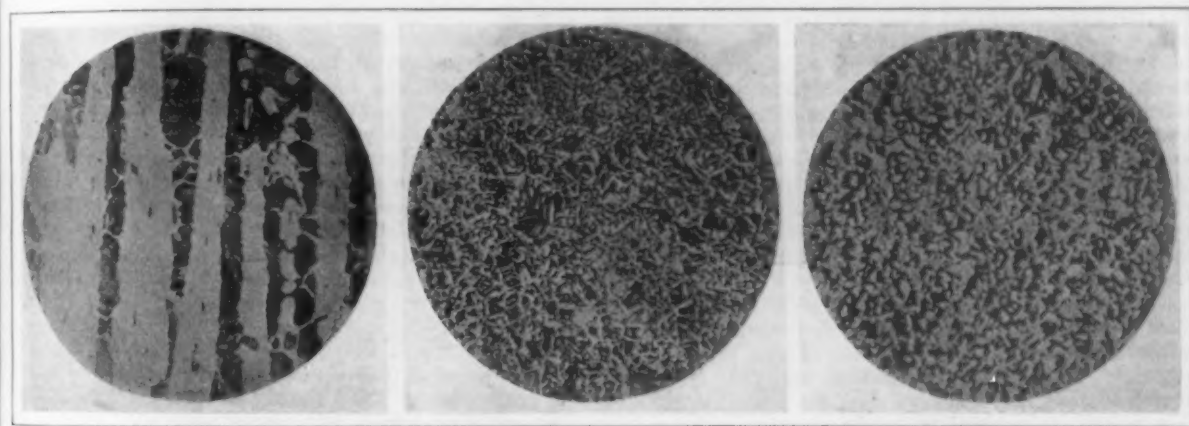


Fig. 1

Fig. 2

Fig. 3

Photomicrographs of Axle Steel, Reduced About One-third from a Diameter of 60. Fig. 1 Shows a Section Across the Rolling. Fig. 2 Shows Structure After Annealing. Fig. 3 Shows Structure of Rolled and Forged Axle

fairly large pearlite crystals may still be seen, but on the whole the structure is interlocking and good. The forged axle shows traces of the parallel arrangement, but the structure is good. Brinell hardness tests gave the following results:

	With the rolling	Across the rolling
Broken axle, unannealed .....	154.8	149
Broken axle, annealed .....	174	176
Forged axle .....	170	176

These numbers may be multiplied by the factor 3.6 to give the approximate tenacity in kg per sq. mm. It will then be seen that the broken axle comes above the requirement of 50 kg per sq. mm. (71,000 lb. per sq. in.), but annealing has raised it 16 per cent. The tenacity of the forged axle is equal to that of the rolled one after annealing. Finally shock tests were made with a Charpy pendulum hammer on pieces 10 x 10 mm. and 100 mm. long, and a 5 mm. round notch. The results were:

Broken axle, unannealed .....	0.962
Broken axle, annealed .....	4.462
Forged axle No. 1 .....	8.078
Forged axle No. 2 .....	7.762

The results are in kg-meters per sq. cm., and show the extreme brittleness of the coarse structural material. Annealing has improved it five times, but it is still far short of the properly forged axle in quality. The latter proved its reliability in a collision where it was bent more than 90 deg. without showing the sign of a crack.

G. B. W.

don is the next largest holder, having recently acquired from Sir Earnest Cassell the gram he owned.

Some months after the Crucible Steel Company had secured its large body of radioactive ore in Colorado, Dr. Charles L. Parsons, chief of the division of mineral technology, United States Bureau of Mines, Washington, D. C., conceived the idea, with philanthropic purposes, of producing a larger quantity of radium than has been available, to assist in the treatment of cancer and for use along other lines of scientific, medical and surgical work. Learning that the company had the only immediately available supply of radium ore, Dr. Parsons, together with representatives of Dr. Howard A. Kelly, of Johns Hopkins University, Baltimore, and Dr. James Douglas, of New York, who had agreed to furnish the necessary funds, visited Pittsburgh to see if an arrangement could be made to secure a large quantity of its Colorado uranium.

Appreciating the motives actuating the proposed formation of the National Radium Institute, the Crucible Steel Company generously agreed to provide 1000 tons of its uranium ore to the institute. Thirty tons has already been furnished from one of the company's Pittsburgh warehouses, while other shipments are now going forward from the Colorado mines, the company reserving to itself only the vanadium and uranium values contained in the ore. Through the medium of the Bureau of Mines, Drs. Kelly and Douglas and the Crucible Steel Company, it is hoped that great advances may be made in controlling cancer and other malignant diseases by the use of the new supply of radium.

# The Treatment of Blast Furnace Flue Dust\*

## Its Physical and Chemical Properties —Important Methods of Utilization Compared and Processes Discussed

—BY EUGENE B. CLARK†—

Flue dust is the solid material which is carried over by the gases escaping from a metallurgical furnace. That produced by blast furnaces, which is the only kind that will be considered in this discussion, consists of ore, coke and a small amount of limestone, in proportions depending upon the materials charged to the furnace, the manner in which the furnace is operating, and, to a certain extent, upon the lines of the furnace. Every blast furnace is provided with dust catchers and generally other equipment to trap the flue dust, the objects being to clean the gas and to capture the dust. The amount of flue dust produced by a blast furnace varies greatly, depending upon the ores used, blast pressure carried and other conditions, but in this country it perhaps would be fair to say that on an average the blast furnaces permit about 3 per cent. of the total charge to escape from the top of the furnace in the form of flue dust. On this basis there would be approximately 3,000,000 tons of flue dust produced in this country per annum. Inasmuch as the iron content of blast furnace flue dust is within a few per cent. of being as high as the iron content of the ore charged into the furnace, therefore the annual loss of iron in flue dust produced and wasted is enormous. A few years ago it probably could have been said truthfully that a million tons of iron were thrown away each year in this country in flue dust. Of course, iron in flue dust is of no value until recovered, still the annual loss through unrecovered flue dust at the present time runs into figures sufficiently large to warrant close attention on the part of the blast furnace interests to methods of recovery.

The subject is one which has attracted the attention of blast furnace men for many years, and many unsuccessful efforts have been made to develop efficient processes for recovery. At first sight, the problem would not seem to be so difficult, but as a matter of fact, blast furnace flue dust is a refractory material to handle cheaply and to reduce successfully. As a consequence, many earnest efforts to recover flue dust have been unsuccessful and have resulted in the loss of considerable money. It is perhaps safe to say that even to-day most furnace plants throw their flue dust away, not only failing to recover the iron contained therein, but being actually at expense to ship the material out to be used as filling. Millions of tons of flue dust have been used for fill under railroad tracks throughout the iron districts of this country. The increasing use of fine ores and the increasing size and pressure of blast furnaces have increased the production of flue dust during recent years to such an extent that many furnace plants, even though making no attempt to use flue dust at present, nevertheless do save it and put it into stock. Even this is objectionable, however, for the cost of handling into and out of stock piles forms a considerable addition to money tied up in flue dust.

### Physical Properties of Flue Dust

Before proceeding to a discussion of the various existing methods for recovery of this flue dust, it may be of interest to consider briefly the properties of this material. As stated above, it consists of iron ore, coke and limestone, in varying proportions. The iron ore is extremely fine, or it would not have been carried over by the gases. It is a fact that very fine particles of iron ore are generally purer oxides than the larger portions. Therefore the metallic content of the iron ore in the flue dust is generally higher than that of the ore being charged to the furnace. The carboniferous element of the flue dust is in the shape of coke, a considerable portion of which is very fine and is intimately mixed with ore dust and the remaining portion of which is in large pieces that are carried

over when the furnace slips. Most of the limestone also is in large pieces, ejected by furnace slips. If flue dust is passed through screens of about one inch mesh the large pieces of coke and stone will be removed and may be returned to the blast furnace without further treatment. If the flue dust has been wet, considerable fine dust will adhere to the coarse pieces screened out, but the coarse material can still be used to advantage in a blast furnace. In the material passing through the screen there will be from 10 per cent. to 25 per cent. of coke dust and from 25 per cent. to 50 per cent. of iron. The fineness of the dust will be such that from 60 per cent. to 90 per cent. of it will pass through a 40-mesh sieve and from 20 per cent. to 70 per cent. of it will pass through a 100-mesh sieve. The particles will be so graded as to fineness that the material if saturated with water and jarred slightly will pack together in a dense mass which will be difficult to handle, even with a shovel. When packed in this manner flue dust is practically impervious to moisture and is so dense as to be almost impossible to handle, even with a clam-shell bucket. On the other hand, the same dust, perfectly dry, will run almost like water, and if agitated in the presence of any breeze will blow away, forming clouds of dust. The fine particles of coke present give the flue dust excellent abrasive qualities, so that machinery used for conveying or treating flue dust is subject to severe wear. These statements will make clear some of the difficulties, involved in treating flue dust, and it is the lack of consideration of these points that has led to disappointment so many times in efforts to handle flue dust on a large scale.

### Its Chemical Composition

The chemical analysis of flue dust depends, of course, on that of the ore being smelted in the blast furnace. The iron oxide present in flue dust is generally richer in ore than was the iron oxide of the original ore. This is due to two reasons. First, the finest portions of the original ore generally are the purest. Second, the iron oxide contained in the flue dust has been in the blast furnace and subjected to the reducing actions going on therein. Thus some of the iron oxide has been partially reduced. If the furnace is working steadily and smoothly a smaller portion of the iron is reduced. If, on the other hand, the furnace is slipping badly, then much of the flue dust originates far down in the stack and is more completely reduced. Thus flue dust is far from homogeneous, even as regards its iron content alone. This fact explains the great difficulty encountered in any attempted magnetic separation of flue dust, for the magnetic permeability of the different oxides varies through wide ranges.

Such elements as phosphorus, sulphur, silica and other usual constituents of flue dust, vary widely in accordance with the varying conditions under which the dust is produced. To sum up, it may be stated that blast furnace flue dust is a shining example of heterogeneity as regards almost any quality that it possesses. While it may seem rather foolish to be considering so carefully the qualities of a material so lowly as flue dust, still, after all, it is from lack of just such consideration that disappointing difficulties are encountered when efforts are made to handle and treat the material which we are discussing.

### Methods of Utilization

Innumerable efforts have been made to recover flue dust. Only a comparatively few such efforts have been sufficiently serious and sufficiently successful to be dignified by the name process, but even as it is, there are enough methods to warrant grouping under four general heads, as follows: 1, Utilization as flue dust; 2, recovery by briquetting; 3, recovery by roasting; 4, recovery by treatment in a rotary kiln.

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The utilization of flue dust directly in the blast furnace, as flue dust, has been attempted many times, at practically every furnace plant. When the blast furnace is new and working smoothly it is possible to add a percentage of flue dust to the furnace burden and smelt it like an ore. Generally, however, the result of charging flue dust into a blast furnace is to blow it out again in the shape of dust, or, if the flue dust is retained in the charge, its fineness permits it to fill up voids between the larger pieces comprising the charge and to interfere with the passage of gases through the charge. It is almost universally conceded by furnace men that the direct utilization of flue dust is disadvantageous. If this were not so we would have no flue dust problem.

Numerous attempts have been made to treat flue dust in a pugging mill or mixing pan by adding to it a certain amount of water and some binding material. One plan was to use clay as the binding material. This, of course, would be disadvantageous in that the charging into a blast furnace of alumina is merely adding to the charge a material containing no iron, which must be taken through into the slag at the expense of greater fuel consumption.

Another plan contemplated the use of burned lime as a binding material. The result of mixing in a pugging mill water, flue dust and lime would be to make a sort of mortar or concrete, which could be charged into the blast furnace and retained there successfully. The cost of the lime and the handling of the flue dust, however, is more than the value of the iron recovery in the furnace.

#### Recovery by Briquetting

Briquetting consists primarily in squeezing together small portions of flue dust, either with or without some form of binder, resulting in the formation of bricks, which either may be charged into the blast furnace without further treatment, or may be subjected to a subsequent heat treatment before use.

**THE SCHUMACHER PROCESS.**—The Schumacher process consists in mixing with fine dust a small amount of liquid containing some such material as magnesium or calcium chloride in solution, then thoroughly mixing the flue dust to produce as nearly a homogeneous mass as possible, and finally passing it through a briquetting press capable of producing high pressures up to about 6800 lb. per square inch. It is claimed that the liquid which is added produces a catalytic action upon the constituent elements of the flue dust, so that the briquettes, even though they are not very solid when first made, nevertheless tend to harden with age to a point where they may be charged into a blast furnace without physical disintegration. It is to be observed that briquettes formed of flue dust fresh from the blast furnace are firmer and less subject to disintegration than briquettes made from old flue dust. Perhaps the presence of a small amount of dehydrated limestone in the fresh flue dust may assist materially in holding together bricks made from the fresh dust. This process has been tried out to only a very slight extent in this country, though it is understood to be used considerably abroad. It might really be grouped under the preceding general headings, for these briquettes are in reality untreated flue dust put into shape to resist immediate rejection from the blast furnaces.

**THE SCORIA PROCESS.**—This method involves the use of granulated blast furnace slag and lime as a binder. Magnetically concentrated flue dust, thoroughly mixed with the binding agents, is pressed into the form of rectangular bricks and then subjected to the action of live steam for several hours. The result is a brick which is firmer and more durable under shock than briquettes made by the previously described method, though, on the other hand, the process is more costly and involves the addition of non-ferrous material, thus reducing the iron content in the brick and making it less advantageous for charging into a blast furnace. These briquettes are quite fusible and fairly satisfactory as to durability, even though they are formed under pressures much lower (approximately 1500 lb. per sq. in.) than Schumacher briquettes. Also, they are much more porous.

**THE GRONDAI PROCESS.**—This method consists in forming briquettes of moistened flue dust without any binder, piling these briquettes carefully on small platform cars and running the cars into heating ovens, where the briquettes are subjected to a high temperature over a considerable period of time. The carbon contained in the

briquettes is burned out, causing a sintering action throughout the briquette, which causes the final formation of a firm yet porous brick. This process has formed the basis of the development in this country of what might be termed the Tunnel kiln briquetting process. So far as the writer knows, the Grondal briquetting process is little used for flue dust, though it has been applied in several instances in this country for the treatment of fine ore concentrates.

**THE TUNNEL KILN BRIQUETTING PROCESS.**—The especial feature of this method, as developed at the works of one of the large steel plants of this country, is the production of a material suitable for use in an open-hearth furnace. As is well known, iron oxide when used for oreing down a basic open-hearth charge should be high in iron and low in silica content. The iron oxide in flue dust, being comparatively pure, is especially suited for this purpose. The carboniferous content of flue dust, on the other hand, is high in silica, so that concentration of the flue dust is necessary. At the plant referred to much work has been done on the development of concentrating methods. The flue dust, after being screened, is thoroughly dried in drying apparatus such as is commonly in use for drying fuel. The dried dust then is subjected to a magnetic separation, from which the heads carry about 60 per cent. iron and 1 per cent. coke. The tails from the magnetic separators are screened over 20 and 60-mesh screens and the fine material taken to air separators. The heads from this separation are added to the heads from the magnetic separators. This separating plant is the best and, in fact, the only successful solution to date of the problem of concentrating flue dust, a problem which, for the reasons outlined above, involves great difficulty. This plant produces a concentrate running nearly 60 per cent. iron, about 7 per cent. silica and a little over 1 per cent. carbon from flue dust running about 50 per cent. iron, 10 per cent. silica and 10 per cent. carbon. In the process there is a loss of about 10 per cent. of the original iron content of the flue dust. The concentrate is then briquetted in a press exerting a pressure of about 7000 lb. per sq. in. and the briquettes finally treated by passing them through long tunnel kilns, in which they are subjected for about five hours to a temperature rising to about 2400 deg. F. in the hottest zone. The resulting briquettes are unquestionably of high quality, both as to durability and porosity, and as to purity of composition. They are well adapted for use as an open-hearth ore.

#### Recovery by Roasting

The treatment of slimes, tails and low-grade ores by mixing therewith a certain percentage of fuel and then roasting the mass to a sinter has been practised for many years. Inasmuch as flue dust is practically an iron ore, containing a percentage of carboniferous matter, it is natural that attempts should be made to sinter this material in a similar manner to that above mentioned for non-ferrous waste materials.

**THE HEBERLEIN POT.**—With this apparatus flue dust is treated by first thoroughly mixing it into a mass as nearly homogeneous as may be, then charging the same into a large pot, shaped somewhat like a Bessemer converter and holding several tons of material. The material is ignited from the bottom and a draft of air forced up through from the bottom. The air supports combustion of the carbon contained in the mass, and the ignition gradually progresses upward. The result is to burn out the carbon and to sinter the contents of the pot into a solid though porous mass. When the sintering action has progressed throughout the material the pot is inverted and the mass which falls out of the pot is broken up into pieces small enough for use in the blast furnace. Difficulties experienced on account of the mass adhering to the sides of the pot, and the difficulty of breaking up the sintered mass after dumping the pot are serious. The process has not been commercially applied to flue dust. In order to make it practicable concentration of flue dust would be necessary, or the mixing into the charge of considerable percentages of material, such as fine ore, which is free from carbon.

**THE GREENWALT PROCESS.**—This method involves the same underlying principle of roasting or sintering, but differently arranged apparatus is employed. The principal difference is that the draft is down through the mass of material to be treated, rather than up. The pot or pan is of

comparatively large dimensions, say 8 ft. square by about 12 in. deep. This receptacle swings in trunnions through which air is exhausted from a false bottom similar to that used under a Bessemer converter. The bottom of the pan consists of grates over which a layer of porous material is spread to prevent adhesion of the sintered mass to the grates. The flue dust is thoroughly mixed and tempered with water to obtain a mass as nearly homogeneous as possible, and then is charged into the pan, with care to obtain uniform distribution and density. A suction fan establishes a draft from the surface of the pan down through the material. An oil burner is used to ignite the carbon at the upper surface of the pan. Combustion, supported by the draft, proceeds down through the mass. When the sintering action thus established has reached the bottom of the pan the pan is swung in its trunnions and its contents dumped. A certain percentage of material at the top and sides of the pan, and occasionally throughout the mass, which remains unsintered, may be screened out of the final product and returned for mixing into another charge. The product of this process is porous and entirely satisfactory for blast furnace use. Most flue dust contains too much carbon for the satisfactory carrying on of the process, however, and much better results are obtained when a certain percentage of material, such as fine ore, free from carbon, is added to it.

**THE DWIGHT AND LLOYD PROCESS.**—Here again the fundamental principle is the same as in other roasting processes. The essential features of this method are comprised in the form of apparatus employed. The draft to support combustion during the sintering process is downwards, as in the previously described process, but instead of carrying on the sintering action in large pots, it is carried on in a much larger number of smaller pans. These pans are joined end to end to form a continuous conveyor. The material is mixed and moistened to make it as homogeneous as possible, and it then is charged, with due care to obtaining an even distribution, into the pans or pots in which the sintering action is to be carried on. The bottoms of these pans are formed of cast-iron grates, over which a layer of porous material is spread to prevent adhesion of the sintered mass to the grates. Suction established by means of a fan takes air down through the material in the pans into a suction box, over which the pans progressively pass. Also, ignition of the material in the pans is established by means of an oil burner, under which the pans pass in succession. The sintering action goes on so long as the pans are over the suction box, and shortly thereafter the pans are inverted and the sintered material contained therein delivered to screens. Material which passes over the screens is loaded for delivery to the blast furnace, whereas the unsintered material which passes through the screens is returned for mixture into succeeding charges. The product of this process is also porous and well adapted for blast furnace use. Most flue dust contains too much carbon for the proper carrying on of this process, and much better results are obtained when non-carboniferous material is mixed in with the charge to reduce the carbon content of the charge.

#### Treatment in a Rotary Kiln

This process, which may be termed sintering, but which perhaps is more clearly expressed as nodulizing or clinkerizing, consists in treatment of flue dust in a rotary kiln similar to that used in the cement industry for the burning of cement clinker. Flue dust without preliminary treatment is charged into the upper end of an inclined kiln in which a high temperature is maintained by the combustion of fuel at the lower end. This fuel is generally pulverized coal, blown in with an air blast. The material is conveyed through the kiln by the rotating thereof and is agitated thereby while subjected to the high temperature. The result is to sinter the flue dust and to cause the small sintered particles to agglomerate into nodules varying in size from an eighth of an inch to an inch and a half in diameter and being roughly spherical in shape. These nodules are porous and of excellent quality, physically and otherwise, for use in a blast furnace. The difficulty of conducting this process arises from the tendency of the sintered material to adhere to the interior of the kiln, accumulating there and, if not removed, blocking the passage of additional material through the kiln. This difficulty is overcome by a cleaning device, consisting of an endless chain carrying metal scrapers. This chain moves through

the kiln, from one end to the other, while the kiln is rotating and progressively scrapes all of that portion of the interior upon which sintered material is liable to accumulate. The speed and tension of the cleaning device are variable and under control. The speed of the kiln also is under control, thus regulating the time during which the flue dust is subjected to sintering action. It is claimed for this process that the simplicity and sturdiness of the apparatus involved, and the possibility of avoiding preliminary treatment of flue dust, more than compensates for the fuel required to support the high temperature in the kiln. It is probable that the sintering action in a rotary kiln is precisely the same as the sintering action in blast roasting processes, or the sintering which takes place when flue dust briquettes are subjected to high temperature in an oxidizing atmosphere. In a rotary kiln, however, the continuous agitation of the material during the sintering process reduces the size of the voids and makes a material which, while entirely porous, still has smaller pores and therefore is denser.

#### Relative Merits of Various Processes

Naturally it is of interest to compare these various processes, as to costs of plant required, costs of operation and value of the product. A fair comparison, however, is extremely difficult to make. As to costs, it may be observed that no one, until he is thoroughly embarked in the working of flue dust, will appreciate the difficulties involved in handling efficiently and economically such a material. If an attempt is made to handle it by simple means, that is, without elaborate machinery, it will be found that the labor costs will become serious. If, on the other hand, elaborate machinery is used, then a low labor cost may be obtained, but the wear and tear on the machinery will be found to be a serious item. Most processes naturally are tried out on a small scale at first. During such a preliminary trial the dust is handled by simple means, involving rather large labor charges. If the difficulties involved in handling flue dust cheaply by machinery are not fully realized it is quite natural to take an optimistic view of probable results from the preliminary experiments. That is to say, it will be assumed that the labor costs can be eliminated by machinery installation, but proper allowance is likely not to be made for the cost of maintaining and operating machinery used for handling flue dust. As a result, estimates of costs hoped for in a larger plant are not realized.

With reference to the various processes referred to, it is perhaps fair to say that each method has certain advantages as well as disadvantages. For instance, where a low cost of operation can be obtained sacrifice must be made in the quality of the product and its value for use in the blast furnace. On the other hand, where thoroughly satisfactory blast furnace material is produced, difficulties are encountered in the frequent handling of the material to enable the attaining of high quality of product. In general, it may be said that the principal costs involved in any of these processes are those involved in the handling of the material, and the simpler a plant can be made to produce a satisfactory product the better chance does that plant have to secure low costs of operation.

Considerable speculation has been indulged in as to the chemical, metallurgical or thermal action which causes sintering. The subject is naturally one of interest, but no satisfactory explanation of the sintering action has been put forward. It has been suggested that silicate of iron is formed, which, while fused, serves to bind together the various particles. While this theory seems plausible, still analyses do not reveal the presence of silicate of iron in sintered flue dust, whether formed by blast roasting, briquette roasting or nodulizing.

#### Value of Sintered Flue Dust

The value of sintered flue dust in a blast furnace is also a subject of interest. It is universally conceded that sintered flue dust may be smelted in a blast furnace without the production of additional flue dust. Tests show it to be more easily fusible than an ore; also the fact that it has been partially reduced, not only in its original condition as flue dust, but in the subsequent sintering action, means that less deoxidation is necessary in the blast furnace than in the case of raw ore. Physically, flue dust sinter is better than any ore, for even the best of old range ores contain from 5 per cent. to 8 per cent. of material which

will pass the 100 mesh sieve and which therefore will produce fine dust. Sintered fine dust, on the other hand, should contain less than one-half of 1 per cent. of material which will pass the 100 mesh sieve. Experience over a number of years with varying percentages of fine dust sinter shows that about 10 per cent. of it on a furnace burden acts advantageously, making the furnace operate freer and generally with lower fuel consumption.

In conclusion, the writer feels that in justice to himself he should state that he is interested in one of the processes described above and has been devoting himself to the question of fine dust treatment by this process for about seven years. It is perhaps natural that his judgment as to the relative merits of the processes should be biased. In presenting this discussion, however, he has made the effort to give a fair, brief description of all processes, without arguing in favor of any. If, in doing so, he has failed to give a satisfactory answer to one question in which you are interested, as to which is the best process, he must crave your indulgence for the omission. Furthermore, it is probably true that the final word has not yet been said on any process and that even if one were inclined to draw comparisons at the present time he could not do so with fairness to all. The writer wishes to acknowledge the kind assistance of others who have been working in this field, several of them competitors in a sense, for their courtesy in supplying information.

## Discussion of the Paper

### A Proposed Method of Charging Fine Dust without Sintering

—BY JOHN W. DOUGHERTY\*—

Mr. Clark has covered the subject so thoroughly that it seems futile to attempt to add anything to what he has said on the methods of utilizing fine dust. I will, therefore, confine myself principally to the suggestion of a new method, hoping thereby to set at work the master minds that have been considering this problem, along another line that may lead to an ultimate solution of the problem. The American Iron and Steel Institute is very much indebted to Mr. Clark for bringing forward such an extremely important subject; because without doubt hundreds of thousands of tons of fine dust are thrown away annually which should be prepared in some manner and converted into pig iron, and the ore thus replaced could be left in the ground unmined and conserved for future generations.

### Importance of Consuming the Fine Dust

At the present time, in erecting our new mills at Midland, we are receiving from the railroad company large quantities of refuse material which we are using for fill, and which is delivered to them by different steel companies in the western part of Pennsylvania and eastern part of Ohio. I have noticed a large number of cars loaded with fine dust which came from blast furnaces, and it seemed a pity to throw it away with the granulated slag and ashes, when it should have been converted into pig iron.

I believe that there is plenty of ore available and will be for many years to come, but I think you will agree with me that the iron ore deposits of the world are not inexhaustible, and therefore everything in our power should be done to conserve them, even though we have to go to the limit of spending as much money in recovering the fine dust and putting it into a satisfactory condition for use in the blast furnace as would have to be paid for an iron ore of similar quality at the same unit price delivered at the furnace.

To give a concrete example, we will assume the cost of an iron ore of a certain quality, delivered at the furnace, to be \$4 per gross ton. We will also assume the cost of delivering and treating the fine dust and putting it into proper condition, so as to make it similar in quality to the above mentioned ore, to be \$1.50 per ton. Therefore, the blast furnace is justified in paying the difference, or \$2.50 per ton, simply for saving the fine dust. The amount (\$1.50 per ton) is a very conservative figure, and I know that there are some steel companies that are treating the fine dust and putting it into satisfactory shape, using some

of the methods described in Mr. Clark's paper, for a considerably lower figure.

### Direct Charging of the Fine Dust

The simplest and cheapest method thus far used for saving the dust is wetting it and charging it into the top of the furnace with the ore and coke, which have also received a certain percentage of water. By doing this the fine dust is not only utilized and at least a part of it saved, but one also secures a more economical operation of the furnace, due to the lowering of the top temperature, thus decreasing the opportunity for the reduction of the carbon dioxide by the carbon of the coke, as the carbon dioxide passes through the upper zone of the furnace. The percentage of carbon dioxide is, therefore, increased and the percentage of carbon monoxide decreased. The smaller the ratio between the CO and CO<sub>2</sub>, the greater the efficiency of the fuel in the furnace; hence the advantage of the water introduced with the fine ore or fine dust when charged.

In spite of this method of utilizing fine dust, a certain portion of the material charged is blown out of the top, caught in the dust catchers, wet again and recharged into the furnace, so that an endless chain is established, due to the insufficient adhesion imparted to the fine materials by the moisture. I have given this subject considerable thought and have concluded that this endless chain can be broken, and the loss of dust from the fine dust and the ore eliminated by charging the dust at, or below, the point to which it is carried by the adhesive quality given to it by the moisture.

If you will consider the large quantities of carbon which are deposited in the stock in the top of a blast furnace (due to the dissociation of the carbon monoxide), all of which carbon remains in the stock and is never blown out, except in case of a slip, I think you will agree with me that if these infinitesimally fine particles of carbon are not blown out, but remain in the mass, then surely the fine dust, which is made up of particles which are as mountains to peas when compared with the fine particles of deposited carbon, must remain and will descend with the stock as it passes down through the various zones of the furnace.

It might be stated that the extremely small particles of carbon are not liable to be blown out with the fine dust, because they are deposited in the pores of the small ore lumps. It has been proven, by experiment, that deposited carbon causes disintegration of the ore lumps, and a swelling occurs, showing that the lumps of ore are broken up into fine particles. This is especially true of the more easily reducible ores such as the Mesabi and finer Old Range ores. Now, none of this ore is blown out of the furnace; if it were, it would be accompanied by the deposited carbon. Analyses of fine dust show that all the carbon present is in the form of small pieces of coke.

### A Cheap Method of Recovery Necessary

When the fine dust is blown out, part of it, as stated by Mr. Clark, is in a reduced condition. I have seen the bells of dust catchers dropped and have noticed the particles of spongy iron become incandescent on contact with the oxygen of the air, showing that the reduced iron is being reoxidized. When you consider that this reoxidized iron has to be again reduced when it is put back into the furnace together with the extra cost of handling the fine dust, the added cost of nodulizing, sintering, briquetting or whatever other method is used to prepare it for recharging into the blast furnace, it seems to me that some simple and cheap way to utilize the dust should be devised. Having that in mind, I would suggest the following method:

Cut small openings, evenly spaced around the circumference, perhaps as many as there are tuyeres, in the side of the furnace at the top, having the centers all in the same plane and placed about 10 ft. below the stock line. Through these openings fine dust would be forced at a certain variable rate, which is automatically regulated, and is also under the control of the blast furnace manager. So that if the furnace makes either a considerable or small quantity of fine dust it feeds a proportionate amount.

If the stock in the furnace for any cause were to go below these openings, a dust seal would be maintained back of the openings, so that no escape of gas could occur or heat get to the mechanism. If the supply of dust fails,

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for any reason, the operation of the charging mechanism would be automatically stopped. Large pieces of coke and stone would be screened out, so that only the finer particles would be passed through the charging mechanism.

There might be an objection to charging the flue dust close to the wall. This would be overcome by having the castings which form the openings water-cooled and projecting a certain distance into the furnace in a manner similar to the tuyeres in the hearth. Such castings would offer little, if any, resistance to the passage of the stock and would have practically no effect upon the distribution. Another reason for thinking that there would be no occasion for trouble from this source is that the stock travels downward faster in the center of the furnace than along the walls and thus a rolling action from the walls towards the center is constantly taking place, tending towards an even distribution of the flue dust throughout the mass.

#### Recharged Flue Dust Not All Blown Out Again

Mr. Clark states that, "Generally, the result of charging flue dust into a blast furnace is to blow it out again in the shape of dust; or, if the flue dust is retained in the charge, its fineness permits it to fill up voids between the larger pieces comprising the charge and to interfere with the passage of gases through the charge."

I do not quite agree with Mr. Clark, as experience with a great many furnaces that wet their ores and flue dust refutes this statement. While they do not recover all of the dust, they do recover a good portion of it. I have never seen an ore too fine to prevent its use in a blast furnace ore mixture, providing it can be kept from blowing out at the top; of course assuming that the furnace has good lines, and a satisfactory coke is used. I think, no matter how fine it is, if it can be gotten into the mass of stock which is filled in at the top of the furnace that there will always be sufficient voids to permit the passage of the gas as it ascends through the stock. For that reason, when the flue dust is blown out of the furnace, if it be caught and put back through the sides of the furnace with suitable mechanism into the charge to which it belongs, there will be no trouble whatever, with the regular work of the furnace or with excessive blast pressures. If no flue dust is charged into the top of the furnace with the ore, but a mixture exclusively of ore is used, and water mixed with it, the cohesion of the finer ore particles

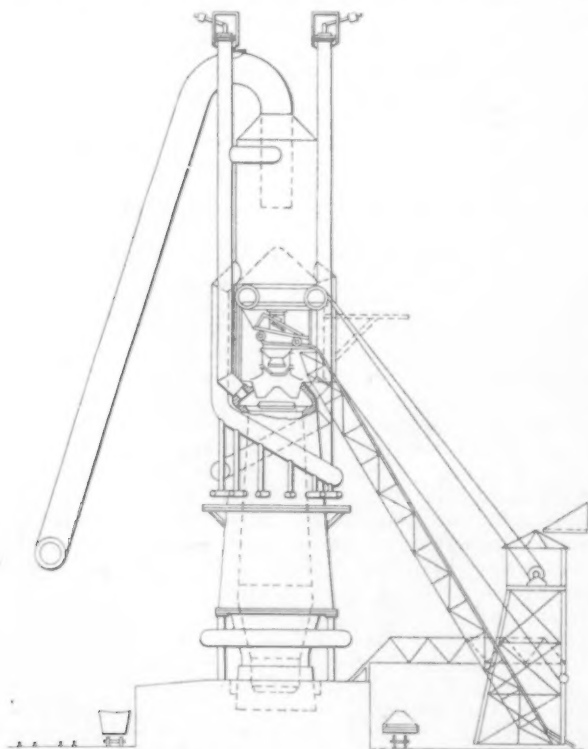


Fig. 1—Modern Blast Furnace with Attachment to Convey Dust to Feeding Mechanism

will be increased, so that while some of the fine ore will be blown out, yet there will be less flue dust made and less work for the charging mechanism to do through the sides of the furnace.

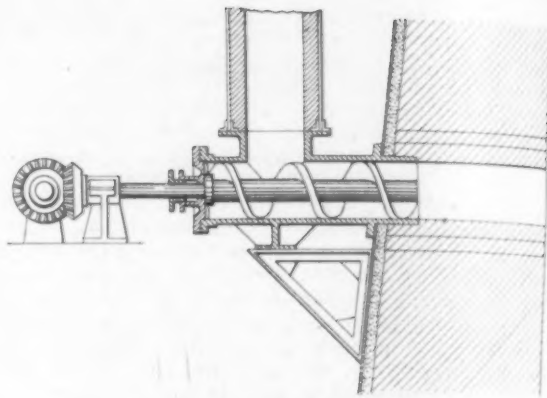


Fig. 2—Type of Feeding Mechanism

I have had this method of utilizing flue dust and fine ores in mind for several years. The illustrations will fully explain my views. Fig. 1 shows the elevation of a modern blast furnace with a dust-catcher erected on its top; a down-comer to convey the gas to the stoves and boilers after it is cleaned is attached thereto. Attachments are also made at the bottom of the catcher to convey the dust to the feeding mechanism which forces it into the furnace. One type of this feeding mechanism is shown in Fig. 2.

#### Discussion by B. G. Klugh

In discussing the paper B. G. Klugh, American Ore Reclamation Company, N. Y., used a number of lantern slide views to illustrate the microscopic porosity of the iron ore sinter produced by the Dwight-Lloyd process. Along with these views the speaker showed slides representing heating cinder, with the characteristic tint and structure of the silicate of iron carried by such cinder. He showed that in sintered iron ore produced by the Dwight-Lloyd apparatus the formation of silicate of iron is avoided by having the temperature under control. With the high temperatures at times reached in some methods of agglomerating fine iron ores there is the liability of coating the iron with silicate, considerably lessening the porosity of the resultant product. It had been demonstrated repeatedly that silicate of iron was practically absent from Dwight-Lloyd sinter and thus its smelting in the blast furnace was accomplished with a minimum consumption of coke.

#### New Haven Meeting of Mechanical Engineers

The programme of a meeting in New Haven, Conn., on November 21 (a change of date from a previous announcement), to be held by members of the American Society of Mechanical Engineers in the Mason Laboratory of the Sheffield Scientific School, Yale University, is as follows:

*Afternoon Session, 3.00 to 5.00 p.m., E. S. Cooley, Chairman*

"Co-operative Industrial Research at the Sheffield Scientific School with Connecticut Manufacturers," by L. P. Breckenridge, professor of mechanical engineering, Yale University.

"A Central Bureau for Industrial Research," by Linn Bradley, Research Corporation of New York.

"Research Work of the Bureau of Mines," by O. P. Hood, chief mechanical engineer, United States Bureau of Mines, Pittsburgh.

"Co-operation of State and University for Industrial Research," by a representative of the engineering experiment station of the University of Illinois.

"History of the Manufacture of Brass," by W. B. Edwards, Ansonia, Conn.

*Evening Session, 7.30 to 9.30 p.m.*

"Safety Devices Used in Connection with Grinding Wheels," by R. G. Williams, Norton Company, Worcester, Mass.

"Experiments with Residence Heating Boilers at the Mason Laboratory," by D. B. Prentice, New Haven.

"Motor Car Testing," by E. H. Lockwood, assistant professor of mechanical engineering, Yale University, with demonstration of automobile testing apparatus in the laboratory.

The Vandyke Churchill Company, machine tools and equipment, has removed from 652 Bourse Building, Philadelphia, to new and larger quarters in rooms 488, 490 and 492 in the same building.

## Correspondence

### Electric Retining of Steel in the Frick Furnace

To the Editor: In *The Iron Age* of September 25 was published a report on the discussion of my paper on the above subject before the Iron and Steel Institute in Brussels and mention was also made of some remarks by Mr. Houbaer, of the Cockerill Company, which were given in a written communication to the Institute. As this communication was not read at the meeting, and as I thus was offered no opportunity to deal with it, the publication of Mr. Houbaer's criticism may create on readers who do not realize these circumstances an impression which it does not deserve.

#### INDUCTION FURNACES CAN BE OF LARGE SIZE

Mr. Houbaer first expresses his doubt whether my conclusions could be trusted when applied to furnaces of 40 tons capacity and used for refining. He seems thus to doubt the possibility of big induction furnaces, but does not give any reason. The fact is that the single ring Frick furnace at the Krupp works in Essen, designed for 40 tons capacity, has been worked with charges up to 12 tons without inconvenience, and it has been found that the furnace behaves rather better with a big charge than with small ones. That people who have had experience with induction furnaces do not fear difficulties with big sizes is demonstrated by the fact that a prominent Austrian works, which for several years has been operating a 4-ton Kjellin furnace, and also has been studying different types of arc furnaces, is now erecting a 13-ton single ring Frick furnace, which as to capacity will equal about the biggest arc furnaces now in operation.

By combining two single ring furnaces of this capacity a double ring furnace of 25 tons capacity is obtained, which should cause no more difficulty than the single ring furnaces. This size will probably satisfy all the demands, as far as capacity goes, which will be required for the next few years. With arc furnaces, the difficulties certainly increase with increased size. It is a well-known fact, as shown in Chicago, that the cost of the electrodes at the 15-ton Héroult furnace still amounts to about \$1 per ton, whereas the cost at smaller arc furnaces is considerably lower. The experiments with the 25-ton Héroult furnace do not yet seem to give satisfaction. It might have been the knowledge of these circumstances which has caused Mr. Houbaer to doubt the possibilities of big induction furnaces.

As to the correctness of the calculations of furnaces up to 40 tons capacity, it is not so difficult to secure as Mr. Houbaer seems to think. I have shown in my paper that the energy supplied to the induction furnace is spent as electrical losses in the magnet core and in the primary coils, as radiation losses and as theoretical or useful work. The theoretical energy per ton of steel required for a certain process is evidently independent of the size of the furnace. The electrical losses are easily calculated in the same way as for any other transformer, and amount in the Frick furnace to only 3 to 5 per cent. The radiation losses depend on the construction of the furnace walls, on the radiating surface of the furnace and on the temperature inside the furnace. It may be true, for other furnaces, that these losses have never been actually measured. With the Frick furnace a great number of observations have been made, from which the radiation loss per square meter at 1500 deg. has been found with great accuracy. To find the radiation loss at 1500 deg. of any furnace it is only necessary to multiply the loss per square meter by the radiation surface, easily found from the dimensions. Adding these three items, the total energy consumption is found. It will be seen that there is no greater difficulty to calculate a 40-ton furnace than a 5-ton furnace.

#### ELIMINATING SULPHUR IN THE INDUCTION FURNACE

Mr. Houbaer further contends that opinions differ as to the possibility of refining, and especially of getting rid of the sulphur in the induction furnace. It is correct that opinions differ on this point. Those who share the opinion of Mr. Houbaer have never had the opportunity to study the refining from sulphur in the induction furnace, and

thus have no knowledge of its behavior, while those who are convinced of the marvelous faculty of the induction furnace either have had actual experience or have been convinced by the facts, made known to them, of the regular desulphurization down to traces carried on in induction furnaces. It is not the first time that facts are simply denied, and that people prefer to believe in their own hypotheses than in facts. The inefficiency of the induction furnace as a refining furnace has for so many years been asserted by people who are looked upon as authorities, that it has become nearly considered as a dogma. But like all false dogmas this will in time also vanish and one will later wonder how it has been possible that it has been supported by so many men of experience and otherwise sound judgment.

In my paper I have broadly dealt with the probable reasons why metallurgists in general have doubted the possibility of refining from sulphur in the induction furnace. From those reasons it may have been justified to doubt this possibility, before any actual experience had been gained. Now such a doubt cannot rightly continue, since it has been proved by years of actual operation that the induction furnace, far from being a poor refining furnace, also in this respect offers advantages over the arc furnace. The results in Dommeldingen are fully conclusive. That Mr. Houbaer himself has no knowledge of the conditions in the induction furnace becomes evident from his contention that the three conditions for such a desulphurization are a fairly liquid slag, a slag with 50 per cent. CaO, and a great reserve of heat, by which I suppose he means a high temperature.

Actual experience has shown that neither of these conditions is necessary. The slag does not need to be very liquid, although it is fluid enough to leave the furnace at tapping; the content of CaO may be 50 to 55 per cent., and with regard to the temperature, the sulphur is eliminated at a temperature of 1500 to 1550 deg. C., a temperature which cannot be regarded as exceptionally high in the metallurgy of steel.

#### NO ADVANTAGE IN THE ARC FURNACE

Mr. Houbaer also mentions the great advantage of the arc furnace through the desulphurization being effected automatically. I wonder whether an elimination regularly, with always the same slag additions, down to below 0.01 and as a rule below 0.007 per cent. of sulphur at such a low temperature is not to be regarded as in a much higher degree automatic than that in the arc furnace, requiring a great reserve of heat. It is, of course, possible to work both an induction furnace and an arc furnace in such a way that no desulphurization takes place, but that is not the fault of the furnace, but of the operator.

The remark of Mr. Houbaer about the great reserve of heat in the arc furnace causes me also to draw attention to the common belief that it is easier to obtain a very hot steel in the arc furnace than in the induction furnace. It is evident that, with sufficient power in the furnace, any temperature may be obtained in the steel, as all the energy that is not spent in electrical or radiation losses goes to the heating of the steel, but the facility of reaching the highest temperatures of the steel is greater in the induction than in the arc furnace. The reason is to be found in the different way of heating. In an induction furnace, in which the heat is generated in the metal itself, no heat transmission is necessary, and the energy is supplied to the steel with equal facility at a high as at a low temperature of the steel. In the arc furnace, where the heat has to be transferred from the arc to the metal, the higher the temperature of the steel the less heat is it possible to transfer in a unit of time from the arc.

#### ENERGY CONSUMPTION IN ELECTRIC FURNACES

Mr. Houbaer evidently has not realized this difference, otherwise he might have found out the reason for himself, why the energy consumption of the Girod furnace at the Krupp works is so high as 1000 kw-hr. per ton. He doubts the correctness of this figure because it is higher than actually observed in big Girod furnaces in other places. I think it would have been fairer not to express such a doubt, considering the facility for Mr. Houbaer to obtain a confirmation from the Girod Company.

In my answer to Mr. Campbell's remarks during the discussion in Brussels I drew attention to the fallacy of

comparing figures for the energy consumption, per ton of steel, obtained in different works. In one place the steel may be tapped at 1520 to 1550 deg.; in another at 1650 to 1680 deg., as is the case at Essen. This makes an enormous difference, especially for the arc furnace; not only is the useful work about 52 kw-hr. per ton greater, but the efficiency of the arc furnace at the high temperature is also considerably lower. Calculating with an efficiency of the arc furnace at this stage as high as 30 per cent., a figure which is rarely surpassed, the extra energy required to raise the temperature of the steel 130 deg. will be about 173 kw-hr. This brings out the great influence of the tapping temperature on the total energy consumption.

On the other hand, the kilowatts supplied to the furnace have also to be taken into consideration. An arc furnace for which 600 kw. is required to cover the losses will give a better result if supplied with 1500 kw. than if supplied with 1200 kw. In the former case, 900 kw. remains for doing useful work as against only 600 kw. in the latter

case and the efficiency will be  $\frac{900}{1500} \times 100 = 60$  per cent.,

as against  $\frac{600}{1200} \times 100 = 50$  per cent. If in the latter case

the practical energy consumption amounts to 1000 kw.-hr. per ton, it would only be  $\frac{5}{6} \times 1000 = 833$  kw.-hr. in the former case.

These examples show the fallacy of comparing figures from different plants without giving full details. The above calculation has shown how, by only altering the tapping temperature or only the kilowatts supplied, a difference of 175 kw.-hr. per ton may result. Mr. Houbaer has thus not been able to substantiate his doubts as to my figures.

#### COMPARISON OF COSTS OF OPERATION

Finally, Mr. Houbaer contends that the final results in pounds, shillings and pence seem to be in favor of the arc furnace. A general opinion of this kind, given without the slightest proof or support, has no value. I have shown in my paper how a difference in energy consumption of 200 kw.-hr. per ton between the Kjellin and Frick furnaces at the Krupp works represents a saving by the latter of not less than £2000 to £2500 a year per furnace. The Girod furnace, if working on the same material, would cause an extra expense of £4000 for current alone, notwithstanding it is supplied with 1200 kw., as against only 650 kw. in the case of the Frick furnace. Were the Girod furnace to be supplied with the same power as the Frick furnace its daily production would be 5 tons, against 25 tons for the same expenses. These, being about 33 shillings per ton in the Frick furnace, would be 5 times higher in the Girod furnace. In the light of such facts Mr. Houbaer's opinion about the advantage of the arc furnace in pounds, shillings and pence appears to be rather badly founded.

That it is possible to build an induction furnace of low economy, and of even as low an economy as the Girod furnace, is not to be denied. The single ring furnace at the Krupp works has shown an average loss of 48 per cent. in excess of the Frick furnace, and double ring furnaces of the Kjellin type will be still more uneconomical, and their efficiency may easily fall below 30 per cent. if they are not supplied with a sufficient amount of power. But my paper deals with the induction furnace of the special type connected with the name of the writer, the great economy of which has been proved, not only by theory but also by practical results.

OTTO FRICK.

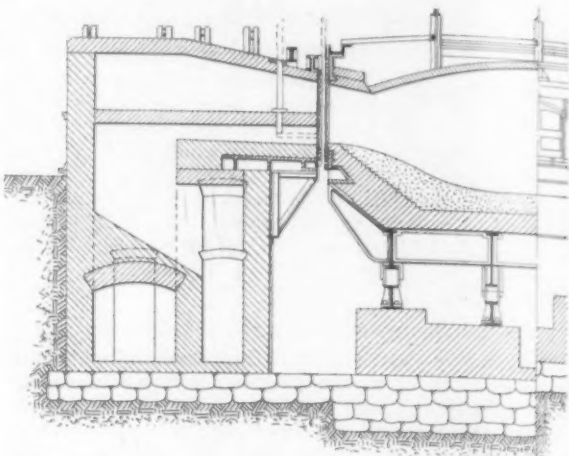
BECKENHAM, LONDON, S., ENGLAND, October 13, 1913.

#### German Steel Practice Follows America Slowly

To the Editor:—Two matters have recently been brought to my notice which have come up in Germany and which in my opinion concern American leadership in the steel industry.

For some time a controversy has been going on in Stahl und Eisen concerning the construction of soaking pits. The matter in dispute concerns the tapping off of the slag from the bottom of the pits. The usual German practice was and is a horizontal tap. However, some engineer got hold of the more practical idea of the vertical tap and this

method was described in the above-named paper and even patented. The entire matter, however, is old American practice of nearly 20 years or so standing, and every European visiting the Pittsburgh, Chicago, or Cleveland district has had an opportunity to see this vertical cinder



Section of End of Old Tilting Furnace Showing Interchangeable Ports

tap. The Germans generally use single pits for each ingot; therefore this tap was made between the pits. That is the only difference in design. But the "leadership" of this invention belongs to the United States and this was "patented" about 20 years later in Germany.

Some time ago some articles also appeared in the same journal on the "so-called" Friedrich interchangeable port in open-hearth practice, and "patented" too. The accompanying illustration of a section of an open-hearth furnace is taken from the book on open-hearth furnaces by M. A. Pawloff, of Russia, published in 1904. It represents a section through the old tilting furnace of the Pennsylvania Steel Company at Steelton, Pa., and shows clearly the same movable section of the ports. Exactly the same construction is used by the Dominion Iron & Steel Company in Sydney. In this case also every European visitor to works in America has had opportunity to inspect such practice and has seen these interchangeable ports as spares on the furnace platforms. Hardly a difference in design is noticeable, but this "invention" about 15 years later than American practice was "patented" in Germany too.

ENGINEER.

#### Purchasing Agents Organize

The National Association of Purchasing Agents is the name of a new organization perfected at the Hotel McAlpin, New York City, on the evening of October 16. H. T. Leeming, of Thos. A. Edison, Inc., was elected temporary chairman, and Elwood B. Hendricks, the organizer of the association, was elected temporary secretary and treasurer. Mr. Hendricks is well known to the purchasing agents throughout the country, having been connected with Hendricks's Commercial Register for a number of years. He is a son of S. E. Hendricks, president Hendricks-Sullivan Corporation. The new association has a membership of over 100 purchasing agents and buyers, representing large industrial corporations, railroads, steamship lines, street railroads, gas and electric companies in New York, New Jersey and Connecticut, and several hundred others have signified their intention of becoming members at the next meeting, which will be called toward the end of November. The association is to be devoted entirely to the interests of purchasing agents and buyers and will have sub-associations in all sections of the country. The address of the temporary secretary is P. O. Box 1406, New York City. Temporary headquarters are in the Hotel McAlpin.

The Bigas Company, Elmira, N. Y., recently incorporated, whose factory and laboratory are at Bridgeport, Conn., is now manufacturing Bigas flux for treating copper, brass, bronze, aluminum and other compositions which it is claimed eliminates imperfections in castings and increases their strength by one-third. Bert Stiles is president.

## Rewarding Managerial Employees

### Youngstown Sheet & Tube Company's Plan of Distributing a Surplus

The Youngstown Sheet & Tube Company, Youngstown, Ohio, has issued a statement with reference to the recent distribution of stock to its employees. The principal point of interest in this distribution is the fact that the company's purpose is not so much with reference to stimulating its men to greater efforts in the future, but to give them a reward for past services. It is believed that no similar case is to be found in the iron and steel industry of a stock distribution being made which goes back into the past and divides with the employees the surplus earned in former years. The statement is as follows:

"At the last annual meeting of the stockholders of the company 5000 shares of the common stock, having a par value of \$500,000, was set aside to be sold to employees of the company in such amounts and on such terms as the board of directors might approve. The board has decided upon a plan for disposing of this stock. Owing to the limited amount available, it is impossible to sell it to all employees who might wish to purchase it. The company, however, has had in effect for some years a profit-sharing plan in which all of its employees participate, and this profit-sharing distribution, we hope, will be continued in the future, so that employees not included in the stock sale will participate in the earnings of the company, as in the past.

"The stock will be sold to employees of the company holding the more important positions of responsibility. In general, this includes, in the executive, sales, and accounting departments, the heads of departments and their chief assistants, and in the operating department the superintendents of departments and their chief assistants, making a total of about 125 employees. Each of these, under the plan of the directors, will be entitled to subscribe to an amount of stock which, at par, is approximately equivalent to his yearly salary.

"In deciding upon the price at which the stock should be sold, the directors were desirous of recognizing the loyalty and efficiency on the part of the company's employees which had been instrumental in earning the present accumulated surplus, a large factor in determining the present market value of the stock, which—were any considerable amount of stock involved—would be about \$175 per share. It, therefore, seemed necessary to make such recognition commensurate with the length of service of the employee, since the longer a man had been in the service of the company the greater part he would have had in the earning of the surplus. Following this reasoning, it was decided to charge the man who entered the company's employ in 1905, or prior to that year, par or \$100 per share for his stock, and to add \$5 per share to the price for each successive year, making the price to men who entered the company's employ in 1913 \$140 a share, or the maximum price charged. This procedure seemed as equitable as any which could be devised, in that the man paying the highest price still secured a very substantial profit, namely, about \$35 per share, and the men entering the company's employ in any one year were all treated alike, there being no favoritism.

"The company has prepared a form of contract for the sale of this stock which will, in every possible way, safeguard the interests of the employees. The principal features of this contract are as follows:

"1. The stock is to be paid for out of the dividends earned by it, and is held by the company for the employee until such time as it is fully paid for and a certificate can be issued. Interest is charged the employee at the rate of 5 per cent. on the unpaid balance, and all dividends in excess of this interest charge are credited to the stock, together with such cash payments as the employee may elect to make. No certificate, however, will be issued to an employee in less than two years from the date of his subscription.

"2. If the employee resigns or is discharged from the service of the company within two years from the date of his subscription, it is provided that he will receive in cash all of his net credits on his subscription, together with an extra dividend equal to 10 per cent. of the par value of the stock subscribed for.

"3. If the employee should die at any time before the subscription is fully paid up, his legal representatives have the right to pay up the remainder of the subscription and receive certificates for the

full number of shares, or they may cancel the subscription and take certificates for the number of shares already paid up.

"4. In case the employee should, at any time, be permanently disabled by injury or sickness, to the extent that he is unable to discharge the duties of his position, he may either pay up the full amount of his subscription and receive certificates for the full number of shares, or he may cancel his subscription and receive certificates for that portion of his subscription which is paid up.

"A résumé of this contract shows that there is no obligation put upon the employee; on the other hand, he is protected in case he is discharged or he resigns, and in case of sickness, injury or death."

## Lake Superior Iron Mining Notes

MARQUETTE, MICH., November 9, 1913.—Several years of persistent exploration, through extensions of underground openings and by the use of the diamond drill, having failed to reveal new desposits of moment, the Oliver Iron Mining Company, subsidiary to the United States Steel Corporation, has surrendered its lease of the Atlantic mine at Iron Belt, in the Wisconsin division of the Gogebic range. Following the surrender of the Plummer exploration by the same company several weeks ago, the abandonment of the Atlantic comes as a hard blow to the western end of the Gogebic country.

The Austin mine at Princeton, Marquette range, a property of the Cleveland-Cliffs Iron Company, has been closed for the winter. The men have been given work at other properties of the company in the Swanzey district.

Very little ore is going forward from the Crystal Falls district of the Menominee range. The Corrigan-McKinney group in that locality is now stock piling all of its output. There are some large tonnages on surface at these properties, notably at the Great Western, the shipments from which hardly have made an impression on the big pile in stock. Oglebay, Norton & Co. are carrying over a considerable amount of ore at their Bristol mine at Crystal Falls, notwithstanding fairly brisk shipments during the season. The stockpile at Pickands, Mather & Co.'s property at Amasa has scarcely been touched, the tonnage sent out having come almost wholly direct from the underground workings.

The liability of the ignition of the sulphur in the rock is a menace confronting operations both in the Crystal Falls and Iron River districts. Where fires of this nature were formerly confined to waste piles, they have latterly been breaking out in the workings. Trouble of this nature is being experienced both at the Bristol and Fogarty mines. The menace at the Bristol is serious. It has been necessary to bulkhead the affected locality. The fire at the Fogarty apparently is not so annoying; it is at no great depth and it is believed the combustion will be confined to a limited locality.

One of the best equipped iron mines in the Lake Superior region is the Jones & Laughlin Steel Company's Forbes property in the Iron River field. The latest acquisition is electrical service, in consequence of which the underground workings, as well as the surface, are illuminated with this most modern lighting agent. The Forbes is a new property, still undergoing development. A second shaft, this to be used for ventilating purposes and as an inlet for supplies, is being sunk. Shipments latterly have been proceeding at the rate of 50 cars daily, with the result that all the ore in stock has now gone forward.

The Cleveland-Cliffs Iron Company has shipped to furnaces all the ore it had in stock at the Imperial mine in the Michigamme district of the Marquette range. The Imperial has been idle all the year. The property produces a limonite ore of low grade, and ore of this kind has not been in particularly eager demand this year.

Near Beechwood, several miles west of the Menominee range, so far as that district has been developed, the Longyear Drilling Company is testing a tract in the vicinity of Mud Lake. A number of holes will be bored during the fall and winter. There is much interest in the outcome.

As taxes on its holdings in St. Louis County, in which the bulk of its Mesaba range mines are located, the United States Steel Corporation has paid to the county treasurer, at Duluth, the sum of \$1,516,629, this being the final annual installment for 1912. On the same account, the Great Northern ore interests have paid the sum of \$106,950.

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## The Business Outlook

Business men are asking each other the question as to whether the country is now entering on a period of prolonged depression, or whether we are passing through a readjustment of conditions which will simply be temporary.

Ground for apprehension has been given by pessimistic utterances of leading bankers who have been seriously disturbed by banking and currency conditions and who have looked toward legislation in this respect as being imperatively needed to ward off financial disaster. A prominent New York banker, who recently appeared before the New York Chamber of Commerce and made a statement which was accepted as indicating that he feared a panic in the near future, has come out with an explanation of his statement which is reassuring. So prominent is this banker that his original statement was of sufficient importance to bring about a decline in stocks in Wall Street. He says that his remarks were misunderstood. He, with other bankers and financiers who have since been interviewed on this subject, believes that nothing like a financial panic or crisis is in sight. On the contrary, he is of the opinion that money is likely to work into a comfortable situation next year. At the same time he makes the statement that "if currency reform be not enacted before long we shall likely feel the disappointment and discouragement about this in an extended period of depression which may result politically and economically in a very unsatisfactory state of affairs."

Those who are engaged in the manufacture or sale of iron and steel products do not need to be told that the volume of business is steadily declining, that prices are crumbling and that working forces are being diminished. This state of affairs is found in other branches of trade but not universally. There are some lines of business, notably textiles, which are in a fair state of activity, brought about by a long period of dullness and abstention from buying while the revision of the tariff was in progress. The textile trade, therefore, is in an exceptional condition, which must be attributed wholly to the influences within that trade and not of a general business character. With the possibility of unsatisfactory currency legislation, the expectation of drastic anti-trust legislation this winter and the continued indisposition of capital to make new investments, it would appear that little hope is to be entertained of much improvement in business in the winter months. On the other hand, if intervention in Mexico should be decided upon, this might have a slightly stimulating effect on some branches of activity. The war with Spain was one of the causes contributing to a revival of prosperity in 1898. While war is to be deplored, nevertheless it causes large expenditures for all kinds of supplies, and the effect of such expenditures by the Government is stimulating to general trade. Again, if the Eastern railroads should be successful in securing from the Interstate Commerce Commission permission to advance their freight rates, this would be a strong factor in bringing about purchases of needed equipment and supplies by numerous railroad companies.

It is difficult to conceive how a depression can be prolonged under the conditions prevailing now. Stocks in consumers' hands are undoubtedly low as the result of conservative buying for the whole period during which the tariff was being revised. There has been no over-speculation either in stocks or in real estate

for a long time. New construction has by no means been so active this year as in times when money was abundant and capitalists were free in either making investments of their own or furnishing the means to others. The country has been accumulating for a long time, and there must be a great deal of idle capital awaiting a favorable opportunity for investment. The readjustment of domestic prices to meet conditions brought about by the revised tariff will not be so serious as to cause great disturbances in manufacturing industries, and it is to be expected that such readjustments will be accomplished within the next few months. It is therefore reasonable to suppose that with the advent of the spring months it will be found that most of the unfavorable influences now confronting us shall have either passed over or else shall have been deprived of their power for evil. The coming few months may prove to be a period of more or less business disturbance, but it is difficult to see how such a state of affairs can extend beyond next spring.

### A General Union of British Employers

The recent announcement that a general union of employers is in process of organization in Great Britain has resulted in much discussion as to the wisdom, efficacy and ethics of the movement. The purpose is to consolidate the resources of the owners of industries in order that they may retain their freedom to bargain individually with workers or collectively with the unions. At a recent meeting two large manufacturers promised each to contribute £50,000 toward a guarantee fund. Each member will be invited to contribute to this fund an amount commensurate with his interests, to a total of £50,000,000, no individual guarantee to become operative unless this sum is secured. It is expected that calls on the fund to the maximum extent of  $7\frac{1}{2}$  per cent. in any one year will be adequate to secure protection for men willing to work and employers willing to employ. In the event of a struggle rising out of unjust demands of trades unions, the members would be backed by the fund.

Labor conditions in the United Kingdom are undeniably bad. American employers who complain of the troubles caused by organized labor in this country have small realization of what their British competitors are up against. To quote an editorial in the *Engineer*:

Whatever may be the merits or demerits of the proposed union, one thing is clear: employers have been compelled to adopt some measures for their own protection. During the last few years—in fact, ever since the trades dispute act became law—the country has been in a perpetual state of industrial unrest, and this, though there has been a boom in trade. The government knows but one cure for the revolution of labor: it is boards and more boards. If a strike takes place a board is appointed. This board holds an inquiry, and in nine cases out of ten the decision is more or less favorable to the workmen. As a general rule, it is only where a decision is favorable that it is accepted by the men. Unless they can get a ruling in their own favor they prefer to continue the policy of a strike. In these circumstances employers are naturally drawn more closely together for their own protection. Indeed, their having formed this new trade union is but the result of the trades dispute act. Opinions as to the wisdom of the new policy are many and varied. The *Times* appears to think that it will tend to widen the breach between capital and labor, and that it will be regarded as a challenge by all members of the workers' unions. Our answer to this kind of criticism is that as long as men combine the maximum of effrontery with the minimum of responsibility, for bringing about wholesale breaches of agreement, the legitimate influence of the

trade union proper is reduced to the vanishing point. It is to defeat those who organize and foment the sympathetic and wanton strike that many employers of labor are apparently willing to guarantee the payment of large sums by way of compensation.

One English observer puts it that many threatened strikes, which are almost as bad as those which actually mature, would also be prevented. It is true that this action on the part of the employers may bring matters to a head, he says, but the sooner this comes about the better it will be for everybody. The situation as it stands today is intolerable because the employer is so intimidated that he can hardly call his soul his own.

In the United States organized resistance to organized labor has undoubtedly worked out to the mutual advantage of the owners and of the men who prefer to be governed by their own bargains as individuals with their employers rather than by those planned and attempted by men whose profession it is to create and govern unions of men. A common mistake is to presume that all those taking part in a strike are in sympathy with it. With the better classes of workmen the majority submit to the dictates of the minority. Many men join unions who do not attend the meetings. It is safe to assert that in by far the greater number of plants employing mechanics, where the establishment has been "unionized," most of the best workmen never take part in the deliberations of their organizations. They permit the demagogues and men who would increase their own earnings through the establishment of union principles to select the governing officers, and later take the consequences themselves.

The influence of an association of employers, prepared to render active assistance, financial and otherwise, in fighting the battles of the members against unjust demands of the unions, is tremendous in averting serious labor troubles. Not alone is such a body a check on the aggressive demands of employees, organized in what the leaders term a common cause, but it is a preventive against unjust action toward workmen on the part of the members. Lockouts as well as strikes are averted. The mere knowledge that the organization exists is a powerful deterrent. The influence has been one for good. The improvement in working conditions has not been hindered. Wages are just as high, or perhaps higher, than they would have been had no such movement been started. Labor is more contented. And the percentage of idle workmen in a year, because of strikes and lockouts, has been greatly reduced. The result in Great Britain should be much the same, if the attempt to create the new association is successful.

### Pig-Iron Production Comparisons

The fact that pig-iron production in October, as shown by our monthly blast-furnace report a week ago, was less than in October, 1912, is of special statistical interest. Each previous month this year had shown a greater output than the corresponding month of last year. It follows that the period of 12 consecutive months showing the largest output was the period ended with September. That output was approximately 32,375,000 gross tons. The best record in any previous period of activity was 29,800,000 tons, made in the 12 consecutive months ended with July, 1910. The increase is 8.6 per cent., in a trifle over three years.

The bearing of this observation, of course, lies in its application. The period of heavy production in 1909-10 was different in several respects from that just ended. In the first place, the steel-making capacity did not seem to be at all fully employed in the earlier period, while it was in practically full employment in this recent period. The reason for this divergence is that in the earlier period the merchant furnaces made substantially as much pig iron as in the later period, and indeed their maximum rate for a single month, as shown by our returns, was a trifle greater than the maximum rate in the period just ended. The entire increase in the total production of pig iron, therefore, has been effected by the steel-works furnaces.

In another and very important respect there has been a difference in the two periods. In that of 1909-10 there was a large accumulation of stocks of material. Merchant furnaces themselves piled a great deal of iron, and their customers also accumulated considerable iron. Very considerable tonnages of finished steel were stocked by jobbers and manufacturing consumers. This was in part the result of the strenuous buying movement of the latter half of 1909, when prices were advancing rapidly and when all buyers were convinced that their contracts were giving them bargains.

On October 1, 1913, at the end of a twelvemonth in which 8.6 per cent. more pig iron was made than in the twelvemonth falling in 1909 and 1910, the condition as to stocks was altogether different. There had been no net accumulation of pig-iron stocks during the twelvemonth, but rather the reverse. As to finished steel, it is universally admitted that there are no stocks to speak of. The stocks are much below normal, whereas on August 1, 1910, they were undoubtedly well above normal.

It is quite obvious, then, that the period just ended has been a much more healthy one than the previous period. There has been no overproduction. With this difference, and assuming other conditions, as to the state of trade in general, as unchanged, it would follow inevitably that recovery to the stage of full operation again would be more rapid. The other time, a period of no less than 21 months elapsed before the rate of production reached the average rate of the record twelvemonth. That in itself furnishes clear evidence that there was something wrong with the 1909-10 period of activity. General business did not grow so poor as to require such a length of time for the latent consuming power to grow up to the level.

The production of 32,375,000 tons of pig iron in the twelvemonth ended with last September furnishes a very good index to our real productive capacity. This capacity, of course, is not absolute, but is relative to the prices realized. There must be somewhere in the country a furnace which can make pig iron more cheaply than any other furnace, and there must also be in existence somewhere, though its owner will not step forward to claim the distinction, a furnace which has a higher cost of production than any other. All the other furnaces lie between these extremes, and the commercial capacity to be reckoned is the capacity of those furnaces which can operate without loss under stated market conditions. Under the average of conditions that have prevailed the past year, the commercial capacity may be taken at not a great deal over the 32,378,644 tons actually produced.

We might have a period regarded as one of fair prosperity in which the average prices would not be as high as the average shown in the past twelvemonth but in which the prices would be steady. Probably some furnaces have made pig iron lately without making any money, being attracted into blast by a market price level which did not last long enough to permit them to realize on it. Given such a period, of rather low but of steady prices, the actual commercial capacity might not be found as great as 33,000,000 tons. Given somewhat better market conditions, one might rate the full capacity at 33,000,000 to 34,000,000 tons, but it would certainly require exceptionally favorable market conditions to bring out a production of more than 34,000,000 tons, with the present equipment, and have a profit realized on every ton produced.

It may be observed that there is very little new construction recently completed, or now in progress, and as a project now conceived would not bear fruit in pig iron in much less than two years we shall hardly be able, given only moderate prices for the products, to make as much as 35,000,000 tons of pig iron even year after next. Considering how rapidly demand has sometimes grown in the past, it is well within the bounds of possibility for us soon to find we have altogether less capacity than could be employed. At the moment, of course, the trade is taking rather a different view.

### Educating Foreign Employees

The Industrial Department of the International Committee of Young Men's Christian Associations, 124 East Twenty-eighth street, New York, calls attention to an agency that is proving remarkably efficient in helping to meet the need of educating the illiterate employee, which was discussed in an editorial in *The Iron Age* of October 1. The modern adaptation of the Young Men's Christian Association to industry is shown by the fact that 20,000 non-English-speaking workers are in its classes in English. The United States Steel Corporation, Westinghouse Air Brake Company and International Harvester Company are among those using the association for this purpose. The Y. M. C. A. is proving an economic asset in industry today to an extent that justifies its use. The personal contact with intelligent Americans develops efficiency, loyalty and a spirit of good will among the non-English-speaking workers. A manager of one of the great establishments in the West told Charles R. Towson, one of the New York secretaries, that the company had been saved a strike by the classes in English that had been conducted in the plant at the noon hour during the previous season.

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It is reported that a steel reinforced aluminum cable for electric transmission has been placed on the market. It consists in all of seven strands, the six outer ones being made of aluminum and the inner one of steel of high tensile strength. It is claimed for this conductor that it both transmits the current and has the requisite strength for use in towers which are rapidly displacing poles in transmission lines.

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The other chief points on which the board decided against the men were their requests for overtime pay at the rate of time and a half, and for time and a half and double time for work on trains hauled by two or more engines.

While denying any jurisdiction on the question of higher freight and passenger rates, the board hinted strongly that its opinion was favorable to such increases, especially because of the importance of putting the railroads in condition financially to complete the installation of safety devices and the use of steel cars.

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The capital stock of the company consists of \$10,000,000 common, of which \$8,375,000 is outstanding, and \$1,625,000 preferred, all outstanding. The company has issued \$6,515,000 of an authorized issue of \$10,000,000 of 6 per cent. 25-year bonds, put out in 1910, with second mortgage bonds outstanding amounting to \$1,500,000.

The Lake Superior Iron & Chemical Company owns and operates the following plants: Hinkle furnace, Ashland, Wis.; Pine Lake furnace, Boyne City, Mich.; Manistique furnace, Manistique, Mich.; Newberry furnace, Newberry, Mich.; Elk Rapids furnace, Elk Rapids, Mich.; Chocoday furnace, Chocoday (P. O. Harvey), Mich. It manufactures charcoal pig iron and is a large producer of by-products from charcoal. In recent years the company has expended money liberally in improving its plants, for the purpose of increasing the output and reducing costs of production. The conditions recently prevailing in the iron trade, however, are stated to have reduced earnings when money was needed for interest payments on bonds. The reorganization under way is expected to result in the acquisition of funds sufficient to place the company's affairs on a firm basis.

### October Copper Production and Stock

The regular monthly report of the Copper Producers' Association for October shows the stock of copper on hand November 1, 1913, to be 32,566,382 lb. This is an increase of 2,773,288 lb. over that a month previous. The October statement of the association compares as follows with that of September:

	October, pounds	September, pounds
Stock of marketable copper of all kinds on hand at all points in the United States at the first of the month.....	29,793,094	38,314,037
Production of marketable copper in the United States from all domestic and foreign sources in the month.....	139,070,481	131,401,229
Deliveries of marketable copper in the month:		
For domestic consumption .....	68,173,720	66,836,897
For export .....	68,123,473	73,085,275
Total .....	136,297,193	139,922,172
Stock of marketable copper of all kinds on hand at all points in the United States at the close of the month .....	32,566,382	29,793,094

The production for October was 139,070,481 lb., exceeding that of September by 7,669,252 lb. There was an increase in domestic consumption of 1,336,823 lb., as compared with last month, while the foreign deliveries fell off 4,961,802 lb., making the total consumption 136,297,193 lb., as compared with 139,922,172 lb. in September, a decrease of 3,624,979 lb. The statistical position remains, therefore, about the same as at the first of October.

The Julius King Optical Company, 10 Maiden lane, New York City, has issued a card containing the universal danger sign of the United States Steel Corporation, a red disk, and calling attention to the safety goggles that are made by this company to protect the eyes of workmen in foundries and industrial plants. Copies of this card for posting in dangerous locations in plants can undoubtedly be obtained by addressing the King Company.

John N. Willys, president Willys Overland Company, Toledo, Ohio, has purchased the plant, rights and equipment of the Edwards-Knight Motor Car Company, Hartford, Conn. The car heretofore manufactured by the Edwards-Knight Company will hereafter be made at the Garford plant in Elyria, Ohio.

The bearing of this observation, of course, lies in its application. The period of heavy production in 1909-10 was different in several respects from that just ended. In the first place, the steel-making capacity did not seem to be at all fully employed in the earlier period, while it was in practically full employment in this recent period. The reason for this divergence is that in the earlier period the merchant furnaces made substantially as much pig iron as in the later period, and indeed their maximum rate for a single month, as shown by our returns, was a trifle greater than the maximum rate in the period just ended. The entire increase in the total production of pig iron, therefore, has been effected by the steel-works furnaces.

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For some time a plan has been under way for the reorganization of the Lake Superior Iron & Chemical Company. It is announced that as a part of this plan application was made last week to the United States District Court at Grand Rapids, Mich., for a receiver and Frank W. Blair, Detroit, was appointed. He is chairman of the board of directors of the company and president of the Union Trust Company, Detroit, which is administrator of the estate of Joseph H. Berry, one of the principal owners of the company. The reorganization plan is stated to have received the approval of practically all the English and Canadian bondholders.

The capital stock of the company consists of \$10,000,000 common, of which \$8,375,000 is outstanding, and \$1,625,000 preferred, all outstanding. The company has issued \$6,515,000 of an authorized issue of \$10,000,000 of 6 per cent. 25-year bonds, put out in 1910, with second mortgage bonds outstanding amounting to \$1,500,000.

The Lake Superior Iron & Chemical Company owns and operates the following plants: Hinkle furnace, Ashland, Wis.; Pine Lake furnace, Boyne City, Mich.; Manistique furnace, Manistique, Mich.; Newberry furnace, Newberry, Mich.; Elk Rapids furnace, Elk Rapids, Mich.; Chocolatey furnace, Chocolatey (P. O. Harvey), Mich. It manufactures charcoal pig iron and is a large producer of by-products from charcoal. In recent years the company has expended money liberally in improving its plants, for the purpose of increasing the output and reducing costs of production. The conditions recently prevailing in the iron trade, however, are stated to have reduced earnings when money was needed for interest payments on bonds. The reorganization under way is expected to result in the acquisition of funds sufficient to place the company's affairs on a firm basis.

### October Copper Production and Stock

The regular monthly report of the Copper Producers' Association for October shows the stock of copper on hand November 1, 1913, to be 32,566,382 lb. This is an increase of 2,773,288 lb. over that a month previous. The October statement of the association compares as follows with that of September:

	October, pounds	September, pounds
Stock of marketable copper of all kinds on hand at all points in the United States at the first of the month.....	29,793,094	38,314,037
Production of marketable copper in the United States from all domestic and foreign sources in the month.....	139,070,481	131,401,229
Deliveries of marketable copper in the month:		
For domestic consumption.....	68,173,720	66,836,897
For export.....	68,123,473	73,085,275
Total.....	136,297,193	139,922,172
Stock of marketable copper of all kinds on hand at all points in the United States at the close of the month.....	32,566,382	29,793,094

The production for October was 139,070,481 lb., exceeding that of September by 7,669,252 lb. There was an increase in domestic consumption of 1,336,823 lb., as compared with last month, while the foreign deliveries fell off 4,961,802 lb., making the total consumption 136,297,193 lb., as compared with 139,922,172 lb. in September, a decrease of 3,624,979 lb. The statistical position remains, therefore, about the same as at the first of October.

The Julius King Optical Company, 10 Maiden lane, New York City, has issued a card containing the universal danger sign of the United States Steel Corporation, a red disk, and calling attention to the safety goggles that are made by this company to protect the eyes of workmen in foundries and industrial plants. Copies of this card for posting in dangerous locations in plants can undoubtedly be obtained by addressing the King Company.

John N. Willys, president Willys Overland Company, Toledo, Ohio, has purchased the plant, rights and equipment of the Edwards-Knight Motor Car Company, Hartford, Conn. The car heretofore manufactured by the Edwards-Knight Company will hereafter be made at the Garford plant in Elyria, Ohio.

# The Iron and Metal Markets

## More Price Recessions Heavy Structural Contracts Pending Better Pig-Iron Business at Low Prices

Undue emphasis should not be placed on the reduction in October of 490,018 tons in the unfilled orders on the books of the United States Steel Corporation. It still has the comfortable quantity of 4,513,767 tons which is quite considerably better than the 3,113,187 tons shown May 31, 1911. The shrinkage in orders may continue somewhat further but it hardly seems probable that the low point shown at the date named in 1911 will be reached. No indications of a general buying movement are yet seen, but in some branches new business is showing an improvement and as consumption of iron and steel continues at a good rate it is to be expected that the filling of current wants will at least provide as much business as is now going through the mills.

Prices continue to show recessions. No sharp breaks have occurred but here and there values have yielded in the sharper competition for new business. Billets and sheet bars have perhaps shown the greatest decline during the week, due to the efforts of new steel-making companies to secure orders. Plates have gone off about \$1 per ton and concessions from recent quotations are to be had on some other finished products. A notable exception in this respect is found in wrought pipe. The consumption of tubular products is so heavy that the mills are filled with work and although it may seem somewhat surprising, the intimation is given that an advance may be made at an early day.

Although it is assumed that offers of foreign steel products are to some extent responsible for weakness in prices here, especially on the seaboard, no business in foreign material is yet reported. It is asserted that these offers have come through brokers or commission houses and that so far no prominent European steel company has made a direct attempt to get business here. While our cable advices to-day show that German semi-finished steel is lower than last week, an advance is made on steel bars and information from other sources is to the effect that German wire products are also slightly higher. The European situation is now believed to have seen its worst and better conditions there are to be expected. It is interesting to note that the price of foreign cotton ties in the South is 40 cents a bundle higher than the price of the domestic product, notwithstanding the removal of the entire duty.

Between this time and the end of December it is expected that contracts will be placed for an aggregate of 80,000 to 90,000 tons of structural material for new subway work in this city. This work is being placed in sections every two or three days so that it will be some weeks until all of it is closed. If all of these contracts were distributed among the four large fabricating companies they would be well filled for four to six months, hence the reported expectation of low plain material prices seems not warranted. Now that the price of tin plates has been fixed for next year's delivery, quite a good deal of contracting has been done by large tin-plate consumers. Manufacturers of tin plate look for a much larger consumption in 1914 than has been the case in the present year.

Interesting news for Birmingham, Ala., is that the

Louisville & Nashville Railroad has bought about 50,000 tons of steel rails from the Tennessee Coal, Iron & Railroad Company for winter delivery. As the company recently received an order for 15,000 tons from the Atlantic Coast Line, its steel plant will have full work for some considerable time. Some new business is coming out in railroad supplies and accessories. The Northern Pacific Railroad last week bought 10,000 tons of tie plates from the Illinois Steel Company. Other roads are making fair purchases of spikes and bolts. Inquiries have been received for 40,000 tons of rails for South Africa and 15,000 tons for the Siamese State Railways. The last Siamese rail order was furnished by the United States Steel Corporation.

Pig iron markets are all weak. Eastern Pennsylvania low phosphorus iron has felt the influence of offers of English hematite and makers of pig iron in other sections are competing quite sharply for such business as is now coming up. A New England buyer entered the market last week for 5500 tons of foundry iron for first half delivery and part of this is understood to have been taken at close to \$13.50 Buffalo. Southern No. 2 foundry iron is again back to \$10.50 Birmingham, according to advices from Cincinnati, while it is reported that a large cast iron pipe maker has bought 20,000 tons for first half delivery at \$10 Birmingham basis.

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type,  
Declines in Italics

At date, one week, one month, and one year previous.

Pig Iron, Per Gross Ton:	Nov. 12, 1913.	Nov. 5, 1913.	Oct. 15, 1913.	Nov. 12, 1912.
Foundry No. 2 X, Philadelphia.	\$15.50	\$15.75	\$16.00	\$18.25
Foundry No. 2, Valley furnace.	13.50	13.50	13.85	17.00
Foundry No. 2 S'th'n, Cin'ti.	13.75	14.25	14.50	17.25
Foundry No. 2, Birmingham, Ala.	10.50	11.00	11.25	14.00
Foundry No. 2, furnace, Chicago*	15.00	15.00	15.00	17.50
Basic, delivered, eastern Pa.	15.00	15.00	16.25	18.00
Basic, Valley furnace.	13.25	13.25	14.00	16.25
Bessemer, Pittsburgh	16.15	16.15	16.65	17.90
Malleable Bessemer, Chicago*	15.00	15.00	15.00	18.00
Gray forge, Pittsburgh	14.25	14.25	14.40	16.40
Lake Superior charcoal, Chicago	15.25	15.25	15.25	18.75

Billets, etc., Per Gross Ton:	Nov. 12, 1913.	Nov. 5, 1913.	Oct. 15, 1913.	Nov. 12, 1912.
Bessemer billets, Pittsburgh.	21.00	22.00	23.50	27.00
Open-hearth billets, Pittsburgh.	21.00	22.00	23.50	27.50
Open-hearth sheet bars, P'gh.	21.50	22.00	24.00	28.00
Forging billets, Pittsburgh.	26.00	26.00	29.00	34.00
Open-hearth billets, Philadelphia	22.90	23.50	25.00	32.00
Wire rods, Pittsburgh	26.00	26.00	26.50	30.00

Old Material, Per Gross Ton:	Nov. 12, 1913.	Nov. 5, 1913.	Oct. 15, 1913.	Nov. 12, 1912.
Iron rails, Chicago	13.50	13.50	14.00	18.00
Iron rails, Philadelphia	17.50	17.50	17.50	19.00
Carwheels, Chicago	12.00	12.00	12.00	17.00
Carwheels, Philadelphia	12.00	12.00	12.25	15.00
Heavy steel scrap, Pittsburgh	11.50	11.50	12.00	15.25
Heavy steel scrap, Philadelphia	10.25	10.50	11.00	15.50
Heavy steel scrap, Chicago	9.50	9.75	10.00	13.50
No. 1 foundry cast, Pittsburgh	12.00	12.00	12.75	15.00
No. 1 foundry cast, Philadelphia	12.50	13.00	13.50	14.75
No. 1 f'dry cast, Ch'go (net ton)	10.00	10.25	10.50	13.25

Finished Iron and Steel,	Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill.	1.25	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.	1.30	1.32½	1.32½	1.67½	1.67½
Iron bars, Pittsburgh.	1.40	1.45	1.55	1.55	1.55
Iron bars, Chicago.	1.15	1.15	1.25	1.55	1.55
Steel bars, Pittsburgh	1.30	1.30	1.40	1.60	1.60
Steel bars, New York.	1.46	1.46	1.56	1.76	1.76
Tank plates, Pittsburgh.	1.25	1.30	1.35	1.60	1.60
Tank plates, New York.	1.41	1.46	1.51	1.76	1.76
Beams, channels & angles, P'gh.	1.30	1.30	1.40	1.70	1.70
Beams, channels & angles, N. Y.	1.46	1.46	1.51	1.86	1.86
Skelp, grooved steel, Pittsburgh.	1.25	1.30	1.35	1.45	1.45
Skelp, sheared steel, Pittsburgh.	1.35	1.35	1.45	1.50	1.50
Steel hoops, Pittsburgh	1.50	1.50	1.60	1.50	1.50

Sheets, Nails and Wire.	Per Pound to Large Buyers:	2 00	2 00	2 05	2 25
Sheets, black, No. 28, Pittsburgh	3.00	3.00	3.10	3.40	3.40
Galvanized sheets, No. 28, P'gh.	1.60	1.60	1.65	1.70	1.70
Wire nails, Pittsburgh.	1.65	1.65	1.70	1.75	1.75
Cut nails, f.o.b. Eastern mills.	1.55	1.55	1.55	1.70	1.70
Cut nails, Pittsburgh	1.40	1.40	1.45	1.50	1.50
Fence wire, ann'd, 6 to 9, P'gh.	2.00	2.00	2.05	2.10	2.10
Barb wire, galv., Pittsburgh.					

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

## Coke, Connellsville,

Per Net Ton at Oven:	Nov. 12, 1913.	Nov. 5, 1913.	Oct. 15, 1913.	Nov. 13, 1912.
Furnace coke, prompt shipment.	\$1.85	\$1.90	\$2.10	\$4.00
Furnace coke, future delivery.	2.00	2.00	2.25	3.25
Foundry coke, prompt shipment.	2.65	2.65	2.75	4.25
Foundry coke, future delivery.	2.75	2.75	3.00	3.75

## Metals,

Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	16.25	16.87½	16.62½	17.75
Electrolytic copper, New York.	15.50	16.50	16.37½	17.55
Spelter, St. Louis.	5.15	5.20	5.20	7.30
Spelter, New York.	5.30	5.35	5.35	7.45
Lead, St. Louis.	4.20	4.20	4.30	4.57½
Lead, New York.	4.35	4.35	4.45	4.72½
Tin, New York.	39.50	40.25	40.35	50.00
Antimony, Halletts, New York.	7.25	7.25	7.12½	9.75
Tin plate, 100-lb. box, Pittsburgh.	\$3.40	\$2.40	\$3.50	\$3.60

## Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier, 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

**Plates.**—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.25c. to 1.30c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¾ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

## Extras.

Cents per lb.

Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8.	.15
Gauges under No. 8 to and including No. 9.	.25
Gauges under No. 9 to and including No. 10.	.30
Gauges under No. 10 to and including No. 12.	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles 3 ft. in diameter and over.	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.	.05
Widths over 110 in. up to 115 in., inclusive.	.10
Widths over 115 in. up to 120 in., inclusive.	.15
Widths over 120 in. up to 125 in., inclusive.	.25
Widths over 125 in. up to 130 in., inclusive.	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft., inclusive.	.25
Cutting to lengths, under 2 ft., to 1 ft., inclusive.	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.30c. to 1.35c. Extras on other shapes and sizes are as follows:

Cents per lb.

I-beams over 15 in.	.10
I-beams over 18 in.	.10
Angles over 6 in. on one or both legs.	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.	.70
Tees, structural sizes (except elevator, hand rail, car-truck, and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .30
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

**Wire Rods and Wire.**—Bessemer, open-hearth and chain rods, \$26. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, car-load lots to jobbers, annealed, \$1.40; galvanized, \$1.80. Galvanized barb wire, to jobbers, \$2; painted, \$1.60. Wire nails, to jobbers, \$1.60.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

	Plain Wire, per 100 lb.						
Nos.	0 to 9	10	11	12 & 12½	13	14	15
Annealed	\$1.60	\$1.65	\$1.70	\$1.75	\$1.85	\$1.95	\$2.05
Galvanized	2.05	2.05	2.10	2.15	2.25	2.35	2.45

**Wrought Pipe.**—The following are the jobbers' car-load discounts on the Pittsburgh basing card on steel pipe in effect from October 27, 1913, and iron pipe from June 2, 1913, all full weight:

Steel.				Iron.			
Inches.	Black.	Galv.		Inches.	Black.	Galv.	
1½, 2 and 2½	73	52½		1½ and 1¾	66	47	
2½	77	66½		2	65	46	
3 to 3½	80	71½		2½	69	56	
				3 to 2½	72	61	
2	77	68½					
2½ to 6	79	70½					
7 to 12	76	65½					
13 to 15	53	..					

## Reamed and Drifted.

1 to 3, butt.	78	69½	1 to 1½, butt.	70	59
2, lap.	75	66½	2, butt.	70	59
2½ to 6, lap.	77	68½	1½, lap.	54	43
			1½, lap.	65	54
			2, lap.	66	56
			2½ to 4, lap.	68	59

## Butt Weld, extra strong, plain ends.

1½, 2 and 2½	68	57½	1½	63	52
2½	73	66½	2	67	60
3 to 1½	77	70½	3 to 1½	71	62
2 to 3	78	71½	2 and 2½	72	63

## Lap Weld, extra strong, plain ends.

2	74	65½	1½	65	59
2½ to 4	76	67½	2	66	58
4½ to 6	75	66½	2½ to 4	70	61
7 to 8	68	57½	4½ to 6	69	60
9 to 12	63	52½	7 and 8	63	53
			9 to 12	58	47

## Butt Weld, double extra strong, plain ends.

1½	63	56½	1½	57	49
3 to 1½	66	59½	3 to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

## Lap Weld, double extra strong, plain ends.

2	64	57½	2	55	49
2½ to 4	66	59½	2½ to 4	60	54
4½ to 6	65	58½	4½ to 6	59	53
7 to 8	58	47½	7 to 8	52	42

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

**Boiler Tubes.**—Discounts to jobbers, in carloads on lap-welded steel, in effect from May 20, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.	Standard Charcoal Iron.
1½ and 2 in.	60
2½ in.	57
2½ and 2¾ in.	63
3 and 3½ in.	67
3½ to 4½ in.	69
5 and 6 in.	63
7 to 13 in.	60

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2½ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

**Sheets.**—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows. f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

## Blue Annealed Sheets.

Cents per lb.

Nos. 3 to 8.	1.45 to 1.50
Nos. 9 and 10	1.50 to 1.55
Nos. 11 and 12	1.55 to 1.65
Nos. 13 and 14	1.60 to 1.70
Nos. 15 and 16	1.70 to 1.75

## Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	1.65 to 1.75
No. 12	1.65 to 1.75
Nos. 13 and 14	1.70 to 1.80
Nos. 15 and 16	1.75 to 1.85
Nos. 17 to 21	1.80 to 1.90
Nos. 22 and 24	1.85 to 1.95
Nos. 25 and 26	1.90 to 2.00
No. 27	1.95 to 2.05
No. 28	2.00 to 2.10
No. 29	2.05 to 2.15
No. 30	2.15 to 2.20

## Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.00 to 2.10
No. 12	2.10 to 2.20
Nos. 13 and 14	2.10 to 2.20
Nos. 15 and 16	2.25 to 2.35
Nos. 17 to 21	2.40 to 2.50
Nos. 22 and 24	2.55 to 2.65
Nos. 25 and 26	2.70 to 2.80
No. 27	2.85 to 2.95
No. 28	3.00 to 3.10
No. 29	3.15 to 3.25
No. 30	3.30 to 3.40

## Pittsburgh

PITTSBURGH, PA., November 12, 1913.

It is still a waiting market, consumers not buying a pound of material more than is absolutely needed. It is claimed actual business being entered by the mills is not above about 40 per cent. of capacity. As a whole, operations are probably running from 75 to 80 per cent. of capacity, and this excess in output comes from old contracts and is also due to the fact that consumption of iron and steel for some months has been in excess of the new demand. When the mills gradually finish up the old contracts on their books and have to depend entirely on new orders, there may be a break in prices, or the market by that time may have settled down to bottom prices. There have been no serious declines in prices in the week, but the market is still settling in some lines to a lower basis. Plates are now openly quoted by nearly all the mills at 1.25c. and on some attractive business, this has been shaded by some of the smaller mills. Bars and structural material are only fairly strong at 1.30c., and if any large business came in the market, no doubt lower figures would be made. Few contracts have yet been made for tin plate on the \$3.40 basis, consumers studying the whole situation carefully before placing orders. Reports are heard of foreign finished material being offered at low figures at different seaboard points, notably Boston and Philadelphia, but as yet local mills have not met the foreign prices and no large business has been closed. Pig iron is dull and weak, and steel billets and sheet bars are settling down to a \$20, or lower basis. The market on coke is weaker, and scrap is dull and neglected. The only bright spot in the whole situation is that almost invariably with orders sent to the mills, there is a request by the buyer to rush shipments. Stocks all over the country are at a minimum, and once confidence is restored, a heavy buying movement will develop. It would take three months' operations or more for mills to furnish a complete stock of finished material, to say nothing of consumption in the meantime. The railroads are doing very little buying, and prospects for business from them are not good.

**Pig Iron.**—There is no active inquiry. Basic is nominally \$13.25 at Valley furnace, but several sellers have offered it at \$13 without finding a buyer. It develops that the recent sale of 5000 tons of basic iron to the Carbon Steel Company for December, January and February delivery was made at \$13.20 Valley furnace or \$14.10 delivered. Bessemer is fairly strong at \$15.25, but there are several large lots being offered and \$15 or lower could be done. We note a sale of 1000 tons of forge iron for December and January delivery at \$13.35 Valley or \$14.25 Pittsburgh. Malleable Bessemer is weak at \$14, but the last reported sale was at that figure. We quote: Bessemer, \$15.25; basic, \$13.25; No. 2 foundry, \$13.50 to \$13.75; malleable Bessemer, \$14; gray forge, \$13.35, all at Valley furnace, the rate for delivery in the Cleveland or Pittsburgh districts being 90c. a ton.

**Billets and Sheet Bars.**—The market continues dull in new demand, and all sorts of reports are going of both billets and sheet bars being offered at very low figures. Some of the smaller steel mills that ordinarily do not sell in the open market, come in once in a while and offer 500 or 1000 tons of steel at a price that the large steel mills will not accept. None of the sheet or tin plate mills is taking out the full amount of steel called for in contracts, and there has been a slowing down in operations among the steel mills on this account. One leading maker reports it is running to only about 75 per cent. of capacity. We quote Bessemer and open-hearth 4 x 4-in. billets at \$21, and Bessemer and open-hearth sheet bars at \$21.50 to \$22, Pittsburgh or Youngstown mills. There have been sales of both billets and sheet bars slightly below these figures. Forging billets remain at about \$26 and axle billets about \$24, maker's mill, Pittsburgh.

**Muck Bar.**—Strikes have been declared by the Sons of Vulcan at the puddling plants of the Youngstown Sheet & Tube Company, East Youngstown, Ohio, and A. M. Byers & Co., Girard, Ohio. These concerns have refused to sign the Sons of Vulcan scale and have declared their mills open. Both plants are in partial operation, but it is believed they will shortly be running full. Muck bar continues scarce, and high grades of bar, made from all pig iron, is held at about \$31 to \$32, Pittsburgh. Eastern bar continues to be offered in this market at lower prices.

**Steel Rails.**—The Carnegie Steel Company received part of the Philadelphia & Reading order for rails for next year delivery. The railroads are slow in placing contracts, but a good deal of business in standard sec-

tions is expected to be given out before the first of the year. New demand for light rails continues active, particularly with the coal mining interests. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

**Plates.**—No orders for cars were placed in the past week, but several active inquiries are reported. The Buffalo, Rochester & Pittsburgh is expected to close in a short time for 1000 box cars and 1000 gondolas. The Pittsburgh-Wabash Terminal expects to get permission from the courts in a short time to purchase 2000 coal cars. New demand for plates is quiet and all the plate mills are badly in need of business. While the leading makers are still adhering closely to 1.30c., plates are being offered by outside mills at 1.25c. or lower. We quote 1/4 in. and heavier tank plates at 1.25c. to 1.30c., f.o.b. mill, Pittsburgh. Reports are that on some plate business recently placed by steel car companies the lower price was shaded.

**Car Wheels.**—The Carnegie Steel Company has taken an order for 8000 steel carwheels to be used on 1000 hopper cars to be built by the Norfolk & Western Railroad at its shops in Roanoke, Va.

**Structural Material.**—There is a fair amount of inquiry, but only a moderate tonnage is being placed. The American Bridge Company has taken the steel for the new Statler Hotel in Detroit, Mich., about 5000 tons, and a contract for three steel barges to be built for the Marvin Sand & Material Company, St. Louis, Mo., about 600 tons. The City of Pittsburgh has sent out inquiries for 2700 tons for the new Atherton avenue bridge, this city. The Blaw Steel Construction Company has taken about 300 tons of steel for extensions to the building for the La Belle Iron Works at Steubenville, Ohio. We continue to quote beams and channels up to 15 in. at 1.30c. to 1.35c., but if any attractive business were being offered possibly the lower price would be shaded.

**Wire Rods.**—There is no new buying, and specifications against contracts are coming in at a fair rate. No orders have been placed for some time to test the market, and we quote nominally at \$26, Pittsburgh, for Bessemer, open-hearth and chain rods.

**Ferroalloys.**—New inquiry for ferromanganese is dull and actual sales are confined mostly to carload lots for prompt delivery. Consumers seem to have the idea that the price of \$50, seaboard, for English 80 per cent. is not going to hold. We quote 80 per cent. foreign ferromanganese at \$50, Baltimore, the freight rate to the Pittsburgh district being \$2.16 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$75; over 100 tons to 600 tons, \$74; over 600 tons, \$73, Pittsburgh. We quote 10 per cent. ferrosilicon at \$22; 11 per cent., \$23, and 12 per cent., \$24, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnaces. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12c. in lots up to 2000 lb.

**Skelp.**—There is a fair new demand, but the market is not very strong. A leading consumer placed an order for 1000 tons of grooved steel skelp at 1.25c., Pittsburgh, and a sale of sheared iron plates 6 1/4 in. wide is reported at 1.65c., Pittsburgh. We quote grooved steel skelp at 1.25c. to 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.65c. to 1.70c., Pittsburgh.

**Iron and Steel Bars.**—The general demand for both iron and steel bars is quiet and prices are tending steadily downward. The severe decline in iron bars is shown by the fact that the bi-monthly wage settlement made yesterday with the puddlers was on the basis of 1.35c. at mill on shipments of iron bars in September and October. Specifications against contracts for steel bars are fair, and the larger mills are pretty well fixed with orders to the end of the year, if consumers take the material out. We quote steel bars for prompt delivery at 1.30c. to 1.35c., and iron bars at 1.40c. to 1.45c., but on any desirable business steel bars could no doubt be bought at 1.25c. and iron bars at 1.35c., Pittsburgh.

**Sheets.**—Mills report a little betterment in new demand, no doubt due to consumers believing that prices are about as low as they will go. With sheet bars at \$21, it is claimed that No. 28 Bessemer black sheets at 2c. leave little or no profit to the sheet mill. The mills are still refusing to enter orders at to-day's prices for delivery in first quarter and first half of next year, and will sell only up to the end of this year. Operations among the sheet mills are steadily decreasing, some mills running to only about 50 per cent.

of capacity, while others are running possibly to 60 or 65 per cent. We quote Nos. 9 and 10 blue annealed sheets at 1.50c. to 1.55c.; No. 28 Bessemer black, 2c. to 2.05c.; No. 28 galvanized, 3c. to 3.10c.; No. 28 tin mill black plate, H.R. and A., 2c., and Nos. 29 and 30, 2.05c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

**Tin Plate.**—As yet consumers are not showing much inclination to place contracts for next year delivery at the \$3.40 price fixed by the mills last week, but are showing an inclination to hold off until general conditions in the steel trade are more settled. Some business has been placed for next year, but so far the amount is small. Operations are steadily being cut down among the tin plate mills, and as a whole output at present is not above 60 per cent. of capacity, if that much. A good deal of the tin plate now being turned out is going into stock. We continue to quote 100 lb. cokes at \$3.40 and 100 lb. ternes at \$3.30 per base box, f.o.b. Pittsburgh.

**Railroad Spikes.**—The railroads are not placing any new orders for spikes and the market is very dull, with prices weak. Several makers state that new orders in spikes do not represent 25 per cent. of capacity. We quote railroad spikes in base sizes,  $5\frac{1}{2}$  x  $9\frac{1}{16}$  in., at \$1.55 and small railroad and boat spikes in carloads at \$1.65 per 100 lb., f.o.b. Pittsburgh.

**Bolts and Rivets.**—Makers state that the new prices on nuts and bolts are being pretty well observed, but new demand continues mostly for small lots to cover actual needs and there is no incentive to anticipate. Operations among the boiler shops are being materially curtailed, and this is shown in the dullness of rivets, which are taken mostly for small lots to meet current needs. We quote button head structural rivets \$1.80 to \$1.85 in large lots and \$1.90 to \$1.95 in small lots, and cone head boiler rivets at \$1.90 to \$1.95 in large lots and \$2 to \$2.05 in small lots. Terms 30 days net, less 2 per cent. for cash in 10 days. The discounts on nuts and bolts are as follows: In lots of 300 lb. or over, delivered within a 30c. freight radius of makers' works:

Cone and lag screws.....	.80 and 20% off
Small carriage bolts, cut threads.....	.75 and 17½% off
Small carriage bolts, rolled threads.....	.80 and 2½% off
Large carriage bolts.....	.70 and 15% off
Small machine bolts, cut threads.....	.80 and 2½% off
Small machine bolts, rolled threads.....	.80 and 7½% off
Large machine bolts.....	.75 and 10 and 2½% off
Machine bolts, with C.P.C. and T nuts, small.....	70 and 12½% off
Machine bolts with C.P.C. and T nuts, large.....	70 and 12½% off
Square hot pressed nuts, blanked and tapped.....	\$6.00 off list
Hexagon nuts.....	\$6.70 off list
C.P.C. and R square nuts, tapped and blanked.....	\$5.80 off list
Hexagon nuts, $\frac{3}{4}$ and larger.....	\$6.80 off list
Hexagon nuts, smaller than $9\frac{1}{16}$ .....	\$7.40 off list
C.P. plain square nuts.....	\$5.30 off list
C.P. plain hexagon nuts.....	\$5.70 off list
Semi-finished hexagon nuts, $\frac{3}{4}$ and larger.....	.85 and 10% off
Semi-finished hex. nuts, smaller than $9\frac{1}{16}$ .....	.85 and 10% off
Rivets, $7\frac{1}{16}$ x $6\frac{1}{2}$ , smaller and shorter.....	.80 and 10% off
Rivets, metallic tinned, bulk.....	.80 and 10% off
Rivets, tin plated, bulk.....	.80 and 10% off
Rivets, metallic tinned, packages.....	.80 and 10% off
Standard cap screws.....	.75, 10, 10 and 7½% off
Standard set screws.....	.75, 10, 10 and 7½% off

**Shafting.**—New demand continues dull and only for small lots, and makers report that specifications against contracts are only fair and far from satisfactory. Prices continue weak and we quote cold-rolled shafting at 62 to 63 per cent. off list in carload and larger lots, but on some recent business placed discounts were one or two points greater. Small lots of shafting are about 60 per cent. off, delivered in base territory.

**Hoops and Bands.**—There is very little new buying, and only in small lots, consumers being covered by contracts placed some time ago against which specifications are only fair. We quote bands at 1.30c., with extras as per the steel bar card, and steel hoops at 1.50c., Pittsburgh, but if any desirable business were offering these prices might be shaded.

**Wire Products.**—There is not much new buying, as the season is pretty well over, but makers report that specifications against contracts are still coming in at a fairly satisfactory rate. The \$1.60 price on wire nails and the \$1.40 price on plain annealed wire are not being strictly held but are shaded about \$1 a ton for delivery at certain competitive points. We quote wire nails to jobbers, \$1.60; cut nails, \$1.60; plain annealed wire, \$1.40; galvanized barb wire, \$2, and painted barb wire, \$1.60 f.o.b. Pittsburgh, per 100 lb., usual terms, actual freight added to points of delivery.

**Merchant Steel.**—Not enough new business is being placed with the mills to fix prices, shipments at present being nearly altogether against contracts placed

some time ago. Nominal prices, which would be materially shaded if any desirable business were offering, are about as follows: Iron finished tire,  $1\frac{1}{2}$  x  $\frac{1}{2}$  in. and larger, 1.35c., base; under  $1\frac{1}{2}$  x  $\frac{1}{2}$  in., 1.50c.; planished tire, 1.55c.; channel tire,  $\frac{3}{4}$  to  $\frac{7}{8}$  and 1 in., 1.85c. to 1.95c.;  $1\frac{1}{8}$  in. and larger, 1.95c.; toe calk, 1.95c. to 2.05c., base; flat sleigh shoe, 1.70c.; concave and convex, 1.75c.; cutter shoe, tapered or bent, 2.25c. to 2.35c.; spring steel, 1.95c. to 2.05c.; machinery steel, smooth finish, 1.80c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and  $1\frac{1}{2}$  in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

**Standard Pipe.**—New demand for both iron and steel pipe is reported by the mills as about as heavy as usual for this season. The recent heavy snow in the Pittsburgh and country districts interfered somewhat with deliveries of pipe and drilling operations, so that consumption over the next two or three months is likely to be smaller. There is a continued active demand for oil country goods, particularly from territory in the Southwest, where drilling operations are being pushed vigorously. It is stated that the new discounts on steel pipe are being firmly held. There is some talk of a reduction in discounts on iron pipe which may come before long.

**Boiler Tubes.**—New demand has fallen off materially and competition among the mills for the small amount of business now being placed is severer than for some time. Discounts on both steel and charcoal iron boiler tubes are being shaded one point or more.

**Iron and Steel Scrap.**—It is understood a large steel interest east of Pittsburgh was the buyer of the heavy steel scrap offered in the lists of the Pennsylvania and Baltimore & Ohio railroads which closed last week, securing probably 3000 tons in all at about \$11.75 delivered. The scrap trade is still very much depressed, and prices show no signs of getting better. Several large consumers in this district are refusing to take in scrap at any prices, stating they have more on hand than they can find room to store. Hardly enough material is being sold to fix prices, which continue very weak. Dealers are quoting about as follows per gross ton for delivery in the Pittsburgh and other districts:

Selected heavy steel scrap, Steubenville, Follanshee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery.....	\$11.50 to \$11.75
Compressed side and end sheet scrap.....	10.25
No. 1 foundry cast.....	12.00 to 12.25
No. 2 foundry cast.....	10.75 to 11.00
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district.....	6.75 to 7.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.,.....	13.50 to 13.75
No. 1 railroad malleable stock.....	11.25 to 11.50
Grate bars.....	8.00 to 8.25
Low phosphorus melting stock.....	14.00 to 14.25
Iron car axles.....	24.25 to 24.75
Steel car axles.....	17.25 to 17.80
Locomotive axles, steel.....	20.75 to 21.25
Locomotive axles, iron.....	25.25 to 25.75
No. 1 busheling scrap.....	11.50
No. 2 busheling scrap.....	7.00
*Machine shop turnings.....	6.50
Old carwheels.....	13.50 to 13.75
*Cast-iron borings.....	7.25 to 7.50
†Sheet bar crop ends.....	13.75 to 14.00
Old iron rails.....	14.25 to 14.50
No. 1 railroad wrought scrap.....	13.50 to 13.75
Heavy steel axle turnings.....	8.75 to 9.00
Stove plate.....	8.00 to 8.25

\*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

**Coke.**—The only active inquiry in the market for furnace coke is one from the Clinton Iron & Steel Company for 325 to 375 tons per day for delivery over the remainder of the year. One concern that bid \$2 on this business was advised that its price was too high. The Clinton furnace of this concern is expected to start within the next two or three weeks. A Western steel company bought recently about 3000 tons of standard grade furnace coke for prompt delivery at \$1.85 or lower per net ton at oven. No active inquiries are in the market for furnace coke on contract for first half of the year delivery, but several leading consumers have stated that \$2 is the maximum price they will pay. We quote standard makes of furnace coke for delivery over remainder of the year at \$1.85 to \$1.90 and best makes of 72-hr. foundry coke at about \$2.75 per net ton at oven to consumers. Some grades of both furnace and foundry coke that are not regarded as strictly of the highest quality are selling at lower figures. The Connellsville Courier quotes the output of coke in the Upper and Lower Connellsville regions last week as 375,230 net tons, a decrease over the previous week of more than 10,000 tons.

## Philadelphia

PHILADELPHIA, PA., November 11, 1913.

Hesitancy still dominates the market. Lower prices in practically all lines have not yet shown any stimulating effect on buying, consumers purchasing against immediate requirements and awaiting the establishment of a stable price basis before entering the market for extended needs. Probable advances in freight rates, as a factor in higher cost of production, are being seriously figured by some producers, particularly when it comes to paring down selling prices to meet foreign competition. Notwithstanding extensive figuring, sales of foreign iron and steel products in this market have been negligible. The pig-iron market has been quiet; prices continue weak and sales of foundry grades have been made under recent quotations. Bessemer iron has been sold at \$16.50 here, and standard analysis low phosphorus is now quoted at \$22.25, delivered here, a reduction of \$1.25 from recent selling prices. Both crude and finished steel products have been in light demand with prices irregular and uncertain. Mill operations continue to decline. Coke is quiet. Old materials are inactive, with prices still weak.

**Iron Ore.**—No new business is moving. Importations in the week ended November 10 were 24,200 tons from Cuba, 20,300 tons from Canada, 4441 tons from Sweden and 1500 tons from Venezuela.

**Pig Iron.**—Consumption in foundry grades is apparently on a comparatively even basis. Furnaces are shipping steadily against contracts, exceeding slightly their current make. Stocks on furnace yards, both in the eastern Pennsylvania and Virginia districts, showed a further decline during October. Orders on furnace books also showed a decline, but as a rule producers are fairly well covered against their output for the remainder of the year. The continued weakness has caused more anxiety to sell, and several producers have made further concessions. First quarter buying is what the trade is waiting for. Current business has been confined to small lots for prompt or near future delivery. A sale of several hundred tons of eastern Pennsylvania No. 2 X foundry, for delivery over the remainder of the year, was made at \$15.50, delivered, but the majority of the producers maintain \$15.75, delivered. Virginia foundry grades have not been active; while some sellers confine business to orders for delivery for the remainder of the year, others are willing to accept orders for first quarter of next year on the present price basis. A recent inquiry for 6000 tons of low grade iron for January-February shipment is still before the trade. Other Delaware River cast-iron pipe makers would consider tonnage at a price, but their ideas of the market are considerably under the level acceptable to sellers. Importations of Middlesbrough pig iron are still talked of, but no business has been reported. Moderate sales of rolling mill forge iron have been to consumers up the State at prices which would represent about \$14.75 to \$15, delivered in this immediate district. An eastern consumer who has been in the market for various steel making grades has purchased upward of 4000 tons of Bessemer from Eastern furnaces, for delivery over the next few months, at about \$16.50, delivered. Unconfirmed reports of a sale of 3000 to 5000 tons of 0.050 low phosphorus pig by the same consumer are heard. Standard analysis low phosphorus is undergoing a price readjustment, on moderate inquiries quotations ranging from \$22.25 to \$22.50, delivered in this district, having been made. This reduction is due to the probability of importing foreign low phosphorus at \$21.50, seaboard, although it is stated that only moderate tonnages of British hematite are available at this time. Buyers are not eager to place orders and await further developments. With general buying light, and little business of a strongly competitive nature before the trade, price fluctuations are not very pronounced, the following range being named for standard brands, delivered in buyers' yards in this district:

Eastern Pennsylvania No. 2 X foundry	\$15.50 to \$16.00
Eastern Pennsylvania No. 2 plain	15.25 to 15.75
Virginia No. 2 X foundry	15.80 to 16.00
Virginia No. 2 plain	15.55 to 15.75
Gray forge	14.75 to 15.00
Basic	15.00 to 15.25
Standard low phosphorus	22.25 to 22.50

**Ferroalloys.**—Carload orders, together with an occasional 100-ton lot, make up the bulk of the business in 80 per cent. ferromanganese. No forward business is reported under negotiation. English ferromanganese continues firm at \$50, but German continues to sell at \$49 to \$49.50, seaboard. Importations at this port

during the week aggregated 398 tons. Ferrosilicon is in light demand.

**Billets.**—New business is extremely light. Specifications have also been lighter. The leading Eastern producer is now operating at less than 50 per cent. of capacity. Current sales are all in small lots, consumers showing no interest in forward buying. Basic open-hearth rolling billets are now quoted at \$22.90 on tonnage business and \$24 delivered on miscellaneous small lots. Forging steel is dull, with quotations ranging from \$4 to \$5 a ton over rolling billets, for ordinary analysis steel.

**Plates.**—The general run of business has been small. Consumers place orders only for material covering immediate requirements. Mills are feeling the decline in unfilled orders. Uncertainties as to prices have considerable bearing on the situation as prospective buyers await further reductions. On miscellaneous business prices range from 1.45c. to 1.50c., delivered in this district. Lower prices are heard of, but have not been substantiated. Considerable boat plate business is still before the trade, and one new inquiry covering 1000 to 1500 tons of plates came out last week.

**Structural Material.**—While fabricators are interested in the volume of structural work coming out in adjoining districts that developing in this immediate vicinity has not been very large. There is little building work of any size ahead. Pending negotiations move slowly owing to price uncertainties. Miscellaneous business in plain shapes continues light. Mill operations show a further slight falling off, and the outlook is not very bright. Prices are uncertain, the market for current small lot orders, delivered in this district, ranging from 1.45c. to 1.50c., but has not been tested by any large lot inquiry.

**Sheets.**—Eastern mills continue to operate at full capacity, but have little business ahead, orders being entirely of the miscellaneous small lot character and largely for prompt delivery. Prices are unchanged, No. 10 blue annealed sheets being quoted at 1.65c. to 1.75c., delivered here.

**Bars.**—Considerable irregularity has developed in prices of steel bars, due to the probability of the importation of foreign bars. On general business 1.50c., here, is quoted for steel bars. Further concessions would be necessary to compete with present offerings of foreign bars close to seaboard. Ordinary iron bars are not very active. Recent quotations have been shaded, 1.22½c. to 1.25c., mill, being named, equal to 1.30c. to 1.32½c., delivered in this district. A number of mills, however, still obtain up to 1.37½c. for the better grades.

**Old Material.**—Business could scarcely be on a small basis. The bulk of the sales represent transactions between dealers for materials applying on contracts. Even very low prices do not seem to attract consumers, who are confronted with curtailed mill operations. Recent railroad lists were of fair size, and some of the material went at low figures. Heavy melting steel has begun to move to the West, where better prices are obtainable. Mills offer from \$10 to \$10.25, delivered, for No. 1 heavy melting steel, at which prices little business is done. A small lot sale at \$10.25 is reported. Rolling mill grades are extremely quiet. Consumers offer \$14.50 for low-phosphorus steel scrap and small sales have been made at close to that figure. Prices are weak and irregular. The following range about represents the market at which business might be done, for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel	\$10.25 to \$10.50
Old steel rails, rerolling (nominal)	13.50 to 14.00
Low phosphorus heavy melting steel scrap (nominal)	14.50 to 15.00
Old steel axles	17.00 to 17.50
Old iron axles (nominal)	17.50 to 18.00
Old iron rails	12.00 to 12.50
Old carwheels	13.00 to 13.50
No. 1 railroad wrought	9.50 to 10.00
Wrought-iron pipe	8.00 to 8.50
No. 1 forge fire	7.50 to 8.00
No. 2 light iron (nominal)	7.00 to 7.50
No. 2 busheling (nominal)	7.00 to 7.50
Wrought turnings	7.50 to 8.00
Cast borings	12.50 to 13.00
Machinery cast	9.00 to 9.50
Grate bars, railroad	9.50 to 10.00
Stove plate	11.00 to 11.50
Railroad malleable (nominal)	

**Coke.**—The demand is quieter. Small lots of standard analysis furnace coke for prompt shipment have been sold at \$1.85 to \$1.90, at oven. Little tonnage business has come out. Producers still hold prices at \$2.25 ovens for forward coke, but consumers continue to withhold business. Odd carloads, with occasional small contracts for the first half of next year represent the move-

ment in foundry coke at prices ranging from \$3 to \$3.15, at oven. The following range of prices is named, per net ton, for delivery in buyers' yards in this district:

Connellsville furnace coke .....	\$4.00 to \$4.40
Connellsville foundry coke .....	4.90 to 5.35
Mountain furnace coke .....	3.80 to 4.10
Mountain foundry coke .....	4.60 to 4.85

## Cleveland

CLEVELAND, OHIO, November 11, 1913.

Business in this city and throughout northern Ohio has been paralyzed by the blizzard that swept across the Central States Sunday and continued with unusual severity for nearly 48 hr. Reports indicate that Cleveland was near the center of this storm. As a result of the heavy snow and the breaking down of wires, train service was practically suspended and the outside world could not be reached by telephone or telegraph. Business in Cleveland was practically suspended Monday and conditions had not improved much on Tuesday. The city was more completely isolated from the outside world than during the floods last spring and many plants were forced to shut down because of the failure of the commercial electrical power. There is little hope that normal conditions will be restored before the end of the week.

**Iron Ore.**—The severe storm that has swept the lakes the past few days has practically put a stop to ore shipments. Boats with cargoes on their way down the lakes have been driven to shelter. One is reported lost and several have been driven ashore or are being pounded to pieces on the rocks. Little information can be secured as yet as to the amount of damage done to lake shipping, but it is believed that as the storm was the severest that lake vessels have encountered in years the loss will be very heavy. We quote prices as follows: Old range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; old range non-Bessemer, \$3.50; Mesaba non-Bessemer, \$3.40.

**Pig Iron.**—The market continues dull, with scarcely enough business coming out to test prices. Prices are weak and lower quotations are reported than those that have prevailed during the past few weeks. It is understood that Northern foundry iron is being offered at \$14, Cleveland, for No. 2 for delivery in the first half. In the Valley No. 2 is offered at \$13.50. It is reported that malleable iron is being offered at \$13.50, Valley furnace, for delivery through the first half. Southern iron is weaker. Resale iron is being offered at \$11.75, Birmingham, for No. 2 for early delivery and some of the furnace companies will sell No. 2 foundry for delivery during the remainder of the year and the first quarter at \$11, Birmingham. Generally consumers are taking no interest in the market, not being ready to buy for their first half requirements. For prompt shipment and for delivery until January 1 we quote, delivered Cleveland, as follows:

Bessemer .....	\$16.25
Basic .....	14.00
Northern No. 2 foundry .....	\$14.25 to 14.50
Southern No. 2 foundry .....	15.35
Gray forge .....	14.00
Jackson County silvery, 8 per cent. silicon .....	18.55

**Coke.**—The market is inactive. Prices are weak but quotations generally are unchanged. Standard makes of furnace coke are being freely offered at \$1.85 to \$2, per net ton, at oven. We quote 72-hr. foundry coke at \$2.75 to \$3 per net ton at oven.

**Finished Iron and Steel.**—The market continued dull until the first of the week, when business came to a standstill because of the storm. There has been some buying in small lots for immediate requirements. Prices show further weakness and desirable orders would bring out low quotations. Plates are still quoted at 1.25c. to 1.30c., but an attractive inquiry would doubtless bring out a 1.20c. price. Steel bars are fairly well maintained at 1.35c., but this price is being shaded \$1 a ton for desirable orders. Structural material is quoted at 1.30c. to 1.35c., the former price being for round lots. Bar iron is in light demand and both of the Cleveland bar iron mills closed down this week. The steel bar mill of the Upson Nut Company has also shut down for several days. Light rails continue in very good demand, but competition for the business is very keen. A fair amount of business is coming out in tin-plate contracts. Warehouse prices are unchanged at 1.90c. for steel bars and 2c. for plates and structural material.

**Old Material.**—The market continues very dull and weak. Quotations on several grades are lower and a

number of quotations are merely nominal owing to the absence of transactions. The outlook is far from promising, and still lower prices are expected. Local mills are taking some material on contract, although the storm has caused a temporary suspension of shipments. Consumers are buying nothing except for early delivery and will contract for no scrap not needed, however attractive the prices may be. The closing down of the local bar iron mills will have a further depressing effect on the market. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.	
Old steel rails, rerolling .....	\$12.00 to \$12.50
Old iron rails .....	12.50 to 13.00
Steel car axles .....	16.50 to 17.00
Heavy melting steel .....	9.75 to 10.00
Old carwheels .....	12.00 to 12.50
Relaying rails, 50 lb. and over .....	23.00 to 25.00
Agricultural malleable .....	9.00 to 9.50
Railroad malleable .....	10.50 to 11.00
Light bundled sheet scrap .....	6.50 to 7.00
Bundled tin scrap .....	11.00 to 11.50

Per Net Ton.	
Iron car axles .....	\$20.00 to \$21.00
Cast borings .....	5.50 to 5.75
Iron and steel turnings and drillings .....	4.25 to 4.50
Steel axle turnings .....	5.75 to 6.00
No. 1 busheling .....	8.50 to 9.00
No. 1 railroad wrought .....	9.50 to 10.00
No. 1 cast .....	11.00 to 11.25
Stove plate .....	8.00 to 8.50

## Cincinnati

CINCINNATI, OHIO, November 12, 1913.—(By Telegraph.)

**Pig Iron.**—Present conditions prove no exception to the general rule of a light buying movement on a declining market. With the probable exception of a round tonnage of iron contracted for by an Indiana melter last week, there have been no transactions of interest made in this territory. The order in question was for about 500 tons each of Northern and Southern foundry grades for first half shipment. There has been a let-up in carload business, that was fairly good at this time last month, and present indications point to an exceedingly dull market through the remainder of the present month. Southern prices have sagged, and as low as \$10.50, Birmingham basis, can be done on No. 2 foundry for this year's shipment. Northern prices are also weak, and it is understood that \$13.50, Iron-ton, has been openly offered for this year's delivery. These reductions have not been successful in bringing out any contract business, and both buyers and sellers are now playing a waiting game. Comparatively few melters in this territory have covered for their first half requirements, but the majority show no desire to go into the market at the present time. Malleable and basic are weak, and there is a dearth of inquiries for this year's delivery. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft .....	\$14.25 to \$14.75
Southern coke, No. 2 foundry and 2 soft .....	13.75 to 14.25
Southern coke, No. 3 foundry .....	13.25 to 13.75
Southern, No. 4 foundry .....	12.75 to 13.25
Southern gray forge .....	12.25 to 12.75
Ohio silvery, 8 per cent. silicon .....	18.20 to 18.70
Southern Ohio coke, No. 1 .....	15.70 to 16.20
Southern Ohio coke, No. 2 .....	14.70 to 15.20
Southern Ohio coke, No. 3 .....	14.45 to 14.70
Southern Ohio malleable Bessemer .....	15.20 to 15.45
Basic, Northern .....	15.20 to 15.45
Lake Superior charcoal .....	16.25 to 17.25
Standard Southern carwheel .....	27.25 to 27.75

(By Mail)

**Coke.**—The break in Connellsville prices has served to check business in this territory. As low as \$1.85 per net ton at oven can be done on 48-hr. coke, with contract figures ranging from \$1.90 to \$2.40. Except on fancy brands, it is doubtful if the last named figure can be obtained, even for first half shipment. The weakness in this particular market has affected other producing centers, and has also had a tendency to slow up business. Agencies who generally report a fair trade in domestic coke at this time of the year state that the majority of their customers are only buying to fill immediate requirements, and that they are not disposed to contract for their future needs. Furnace coke in the Pocahontas and Wise County fields is quoted around \$2.15 to \$2.40 per net ton at oven, and foundry coke is averaging about \$2.75 at oven in all three fields, with a few interests holding firm at \$3 for first half movement.

**Finished Material.**—The carload mill price of No. 28 black sheets is from 2.15c. to 2.20c. and galvanized

sheets are \$1 a ton higher; both of these quotations being f.o.b. cars Cincinnati, or Newport, Ky. There has been a better demand for sheets for nearby shipment, but no long time contracting for any large tonnages is reported by the mills in this territory. Warehouse prices on steel bars have been reduced about 5c. per 100 lb., and 1.85c. is now being freely named. Structural shapes range from 1.90c. to 1.95c. There is considerable more less-than-carload business being done than for some time past. This is probably true in all finished lines. Many users of finished steel had been holding off, expecting lower quotations on account of tariff reductions, and a large number of them have been compelled to come into the market to fill immediate requirements. It is now the general opinion of both the jobbers and retailers in this territory that the tariff question will not affect the market to any further appreciable extent this year.

**Old Material.**—There has been a marked decline in quotations on nearly all grades. The demand continues extremely light, with yard stocks constantly increasing. The weakness in pig-iron prices also is a factor that has had considerable influence in holding quotations down. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton.		
Bundled sheet scrap	\$6.50 to	\$7.00
Old iron rails	11.00 to	12.00
Relaying rails, 50-lb. and up.	19.75 to	20.25
Re-rolling steel rails	11.00 to	11.50
Melting steel rails	9.25 to	9.75
Old carwheels	10.25 to	10.75
Per Net Ton.		
No. 1 railroad wrought	\$8.50 to	\$9.00
Cast borings	4.25 to	4.75
Steel turnings	4.25 to	4.75
No. 1 cast scrap	8.75 to	9.25
Burnt scrap	6.00 to	6.50
Old iron axles	16.00 to	16.50
Locomotive tires (smooth inside)	9.75 to	10.25
Pipes and flues	5.75 to	6.25
Malleable and steel scrap	6.75 to	7.25
Railroad tank and sheet scrap	4.25 to	4.75

## Birmingham

BIRMINGHAM, ALA., November 10, 1913.

**Pig Iron.**—Despite reports emanating from buying points north of the Ohio River, no evidence is found here of Alabama furnaces selling or being willing to sell pig iron under the \$11.50 basis. The leading furnace operators aver that they are adhering to that basis and making sales, and none of them seems to suspect others of breaking the market. One sale of 2500 tons of No. 3 for 1914 delivery brought \$11.25, the equivalent of \$11.75 for No. 2. A large interest says is has been selling small lots of spot iron daily on the uniform level of \$11.50 and is sold four months ahead. Brokers also say that what iron is sold fetches the market price. One firm has had an inquiry for 20,000 tons for 1914 delivery, on which quotations were made, but there has not been a sale. So far, 1914 business has been light. As a general proposition, the market is inactive, but without apparent price changes. The next real buying movement will probably settle that. Southern furnacemen are heartily tired of selling iron without profit, as has been sometimes done in the past, and the output will probably be reduced rather than accept a loss. The Republic Iron & Steel Company, in order to take care of overcrowded order books and demands from customers, has been forced to blow in another furnace. The Standard Steel Company has blown out a stack which was on basic, owing probably to the accumulation of raw steel. The active stacks in Alabama now are 20, as follows: Tennessee Coal, Iron & Railroad Company, 6 at Ensley on basic, 2 at Bessemer and 1 at Oxmoor on foundry; Woodward Iron Company, 3 on foundry; Sloss-Sheffield Steel & Iron Company, 3 on foundry; Central Coal & Iron Company, 1 on foundry; Alabama Company, 1 on foundry; Republic Iron & Steel Company, 3 on foundry. The only net loss from high production are Alice and Standard Steel, both of which were on basic. Steel mill operations at Ensley are on half turn, as has been the case for several weeks. Stocks of foundry iron in Alabama are far under 100,000 tons, which makes the accumulation an unimportant feature in price making. Summed up, the Alabama situation is this: The furnaces are well sold ahead and not inclined to yield the \$11.50 basis; neither is there a necessity for doing so under present state of order books and the urgency of consumers for early delivery. We quote, per gross ton, f.o.b. furnaces in

the Birmingham district (the high figures representing the price obtained for some 1914 iron), as follows:

No. 1 foundry and soft	\$12.00 to	\$12.50
No. 2 foundry and soft	11.50 to	11.75
No. 3 foundry	11.00 to	11.25
No. 4 foundry	10.75 to	11.00
Gray forge	10.50 to	10.75
Basic	11.50 to	11.75
Charcoal	24.50 to	25.00

**Cast-Iron Pipe.**—Water and gas pipe factories are continuing to run on short time, but are kept reasonably busy on that basis with an accumulation of orders for small lots. A heavy movement of water pipe to the Canal Zone took place from the Bessemer works of the United States Cast Iron Pipe & Foundry Company the past week, filling over 40 freight cars. We quote, per net ton, f.o.b. plants as follows: 4-in., \$22; 6-in. and upward, \$20, with \$1 added for gas pipe.

**Coal and Coke.**—More coke is still being offered than there is a demand for, while steam coal is quite inactive. Industrial operations are sagging in several directions and the effect is felt by both coke and coal. Prices are unchanged, however, and we continue to quote coke, per net ton, f.o.b. oven, as follows: Furnace, \$3 to \$3.50; foundry, \$3.50 to \$4.25.

**Old Material.**—Little movement is reported, especially in cast scrap and stove plate. Steel grades are in better demand. Yards are reasonably well filled with offerings. Nominal prices, per gross ton, f.o.b. dealers' yards, are as follows:

Old iron axles (light)	\$15.00 to	\$15.50
Old steel axles (light)	15.00 to	15.50
Old iron rails	12.50 to	13.50
No. 1 railroad wrought	12.00 to	12.50
No. 2 railroad wrought	10.00 to	10.50
No. 1 country wrought	9.50 to	10.00
No. 2 country wrought	8.50 to	9.00
No. 1 machinery cast	10.00 to	10.50
No. 1 steel scrap	10.50 to	11.00
Tram carwheels	10.50 to	11.00
Standard carwheels	12.00 to	12.50
Light cast and stove plate	8.50 to	9.00

## Low Prices Pinch German Makers

Reports of Steel Companies Are Not Satisfactory — Earnings Now Falling

BERLIN, October 30, 1913.

The best thing that can be said is that no further price reductions by manufacturers have been reported. The Mannesmann Röhrenwerke, Düsseldorf, at the end of last week threw the stock market into some excitement by raising the price of seamless tubes 15 marks (\$3.57) a ton. This news, however, was without lasting effect on the quotations of iron shares, being regarded as having too limited significance. On the other hand, shares have been pretty badly depressed by pessimistic remarks made at the annual meeting of the Laurahütte, the leading Silesian company. The annual report of the Deutsch-Luxemburg Company, too, caused much uneasiness on the exchanges. Whereas the dividend requires the distribution of 12,000,000 marks (\$2,856,000), the amount of cash and balances with banks is only 2,000,000 marks (\$476,000). The point, however, that awakened the gravest misgivings was that the floating debt of the company has risen to 41,000,000 marks (\$9,758,000), owing largely to extensive rebuilding and overhauling of the establishments at Dortmund taken over several years ago from the old Dortmunder Union Company. This large indebtedness awakened the fear that a big issue of new stock would have to be taken up. The stock markets have also been disgruntled over statements made at the annual meeting of the Gelsenkirchen Company, where it was frankly admitted that the financial results from now on would not be so satisfactory as hitherto.

Steel Syndicate's Market Summary Not Cheerful

The Steel Works Union, at its regular monthly meeting today, gave out a less favorable market survey than heretofore. It says that since sales were opened in semi-finished products for the current quarter the demands of home consumers have been somewhat more active. The amount of work in hand with consumers, however, continues unsatisfactory and curtailments of production have had to be enforced in many cases. The foreign market is also quiet, but some consumers are still well employed, and therefore the calls for delivery of semi-finished material are satisfactory. Foreign business in heavy rails has grown to a certain extent more active; a number of good contracts have been taken, and others are under negotiation. Calls for

shipment of mining rails have fallen off somewhat. Orders for grooved rails continue to come in, and work is on hand for some months ahead. The market for structural shapes continues very bad, inasmuch as dealers are buying only for immediate needs.

According to private market reports, regular buyers of semi-finished steel are placing smaller orders than hitherto. There seems to be a pretty general conviction that prices have now touched bottom. It is alleged that manufacturers of finished products are in many cases refusing to take orders offered them at the existing unremunerative prices. This would seem to apply chiefly to bars and plates. It begins to be reported that some mills are storing their output rather than sell at today's prices.

The Pig Iron Syndicate began several days ago to take 1914 orders at the reduced prices recently decided upon. The list given out shows average reductions of 3 marks (71c.). The shipments of pig iron this month are reported as being somewhat lighter than in September. From the Lorraine-Luxemburg district comes the statement that trade has grown quieter, and that some companies are taking advantage of this situation to blow out furnaces for repairs, after their long-continued activity. The Burbach-Eich Dödelingen Company is projecting a considerable enlargement of its establishment at Esch, including several furnaces. The Krupp Company has recently blown in its tenth furnace at its Friedrich-Alfred works on the Rhine.

#### Trying to Get Tube Makers Together

The advance in the price of seamless tubes above mentioned appears to be connected with a movement to bring about an understanding, if not a closer relationship, among the different producers. A conference was held in Berlin this week, at which it was agreed to make another effort to organize a strong syndicate in gas and boiler piping of welded steel or wrought iron, and a formal meeting for that purpose will be held November 7. Meanwhile it was agreed to take no orders till then, except where prompt shipment is called for and specifications are sent in with the order. It appears that all the producers are taking part in the movement.

The Belgian market has this week sent in no further reports of price reductions. The impression made in Germany is that makers there are now trying, like German makers, to hold prices at the present level at least, and await the first favorable opportunity to make advances.

Reports from Russia indicate that there has been no relaxation of prosperity in the iron trade this year. The shipments of the Prodamera, the organization of southern Russia and Polish works, for the first nine months of the year amounted to 1,970,000 tons, against 1,530,000 tons in the corresponding period last year.

## Boston

BOSTON, MASS., November 11, 1913.

**Old Material.**—The dullness continues with small change in conditions. Scrap is coming out in some quantity. The movement is estimated at about two-thirds of what it was a year ago at this time. Naturally production of scrap has fallen off. The steel mills are buying under a hand to mouth policy. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices.

Heavy melting steel .....	\$8.25 to	\$8.50
Low phosphorus steel .....	13.75 to	14.75
Old steel axles .....	13.75 to	14.75
Old iron axles .....	21.25 to	21.75
Mixed shelling .....	13.25 to	13.50
No. 1 wrought and soft steel .....	10.00 to	10.25
Skeleton (bundled) .....	6.50 to	7.00
Wrought-iron pipe .....	8.00 to	8.25
Cotton ties (bundled) .....	7.00 to	7.25
No. 2 light .....	3.75 to	4.25
Wrought turnings .....	4.50 to	5.00
Cast borings .....	5.00 to	5.25
Machinery, cast .....	11.25 to	11.50
Malleable .....	8.00 to	8.25
Stove plate .....	7.75 to	8.00
Grate bars .....	6.25 to	6.50
Cast-iron carwheels .....	12.00 to	12.25

## Germans Aggressive for British Business

South African Inquiry for 40,000 Tons of  
Rails—German Sheet Bars Off Sharply

(By Cable)

LONDON, ENGLAND, November 12, 1913.

General trade conditions remain unsatisfactory. Buying is only from hand to mouth. German foundry pig iron is being imported in Scotland. All domestic prices are weak. South Africa is inquiring for 40,000 tons of rails. The position of semi-finished steel is still poor and German makers are more disposed to meet the market. A slightly steadier tone is observed in foreign finished material. Stocks of pig iron in Connal's stores are 155,892 tons against 159,371 tons a week ago. We quote as follows:

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb. f.o.b. Wales, 12s. 9d. (\$3.10).

(The following prices are per ton of 2240 lb.)

Cleveland pig-iron warrants (Tuesday), 49s. 6d. (\$12.03) against 50s. 8½d. (\$12.32) one week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 50s. (\$12.15) against 51s. 3d. (\$12.46) one week ago.

Ferromanganese, £9 17s. 3d. (\$48).

Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 15s. (\$23.11).

Steel bars, export, f.o.b. Clyde, £6 5s. (\$30.48), a decline of 2s. 6d.

Steel joists, 15-in., export f.o.b. Hull or Grimsby, £5 17s. 6d. (\$28.59).

Steel ship plates, Scotch, delivered local yards, £7 7s. 6d. (\$35.89).

Steel black sheets, No. 28, export f.o.b. Liverpool, £9 (\$43.79).

Steel rails, export, f.o.b. works port, £6 7s. 6d. (\$31.02).

(The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.):

German sheet bars, f.o.b. Antwerp, 77s. (\$18.73) against 85s. (\$20.69) one week ago.

German 2-in. billets, f.o.b. Antwerp, 80s. (\$19.46).

German basic steel bars, f.o.b. Antwerp, £4 11s. 4d. (\$22.22) to £4 12s. (\$22.38) against £4 10s. (\$21.89) one week ago.

German joists, f.o.b. Antwerp, £5 5s. 10 to £5 8s. (\$25.55 to \$26.28).

(By Mail)

The French as Well as the  
Germans Making Low Prices

LONDON, November 1, 1913.

The position of the iron and steel markets has certainly not clarified itself since the last letter. If anything things look more hopeless owing to the unceasing competition from abroad in all kinds of semi-finished and finished steel. It is not so much the Germans who are cutting prices as the French. Just lately again, with the Germans pretty confident that consumers would be forced to go to them for material, the French came forward at very low prices. I hear that sheet bars have just been sold by North of France works at well below 80s. (\$19.47) a ton f.o.b., which probably brings the material up to about 84s. or 85s. (\$20.44 or \$20.69) c.i.f. Wales, while the local makers of steel bars for the use of the tinplate and galvanized sheet trades quote 96s. 3d. (\$23.42) delivered Swansea Valley. It is not every one, however, who cares to buy foreign bars, although the material turned out by the French is often very satisfactory. The chance of the Germans getting their price of 85s. (\$20.69) f.o.b. for sheet bars seems to be very remote at present.

Other material such as billets and blooms has a poor market, but there ought to be some buying before long. The remarkable thing is that consumers should have been able to stand aloof for so long without apparent inconvenience. There is no doubt that trade is slackening, for complaints are met with on all hands.

Taken all round, specifications for steel are very slow, and this in spite of the recent price reductions. In this department makers in certain instances are only able to keep their mills running with the greatest difficulty. One Scotch works indeed has already started curtailing operations. German competition in ship plates is being felt sharply, heavy tonnages of these having entered the Clyde shipyards this year, to the exclusion of domestic steel. Prices of steel shipplates and

sections have come down very substantially of late, but the bottom of the market may not yet have been reached, and leading builders express the opinion that the price is still too high, and that under all the conditions of trade a drop of 10s. (\$2.43) a ton from the current level is warranted. At all events consumers are not taking steel at the figures asked and there is a deadlock in new buying. Really it is hard to find anything good to say of the markets, for everywhere gloom is the main feature. The crux of the situation here is of course the very serious falling off in trade in Germany, and until there is some abatement of the altogether unfavorable aspect of affairs there, it is not much use anticipating an improvement here.

Finished bars are in a bad way, which is only to be expected when Belgian and German basic steel bars are to be had at 90s. (\$21.90) f.o.b. Antwerp and buyers not at all convinced that they are cheap even at that figure. The Scotch makers of this material are not happy, several of the works of the combine being closed while some of the others are only working for a few days in the week.

## St. Louis

St. Louis, Mo., November 10, 1913.

Buying continues for small lots, but the orders are more numerous and more widely spread, emphasizing the large proportion of consumers who are close up to their supplies and are yet determined not to enter the market strongly until convinced that no further concessions will be made.

**Pig Iron.**—Melters are urging the movement forward of contract allotments and in many cases ask that quantities specified for the month be delivered within the first week or ten days. While some of the larger melters are known to be pretty well protected for some little time to come, it is also fairly well established that a considerable proportion of the smaller melters are not in position to hold off any great length of time if consumption is maintained at the present rate. Transactions of the moment are not calculated to induce particular concessions by furnace representatives and there is no accentuated weakness to force prices downward. The persistent small lot business is having the tendency to keep prices pretty well maintained in this section. No. 2 Southern foundry, Birmingham basis, is quoted on small lots for prompt shipment at \$11.50, but any competitive business would undoubtedly develop a better price. Ohio iron, No. 2 foundry, Ironton basis, is available here at, probably, \$13.50 in competition, but the quotation is still \$14 on small transactions. No. 2 X Chicago is \$14.

**Old Material.**—Prices as quoted are merely nominal. Consumers are taking no material. They even refuse to accept shipments on contracts and compel dealers to keep the material in their yards while the railroads continue to let material loose upon the market with additionally depressing effect. In addition to the lists previously reported, the week brought out 200 tons from the New Orleans & Northeastern, 200 tons from the Missouri & North Arkansas and 200 tons from the Vandalia. We quote dealers' prices, f.o.b. St. Louis, with the reservation noted as to the actual conditions:

Per Gross Ton.	
Old iron rails .....	\$11.00 to \$11.50
Old steel rails, rerolling .....	11.50 to 12.00
Old steel rails, less than 3 feet .....	10.00 to 10.25
Relaying rails, standard section, subject to inspection .....	22.50 to 23.00
Old carwheels .....	10.00 to 10.50
Heavy melting steel scrap .....	9.75 to 10.25
Shoveling steel .....	8.50 to 9.00
Frogs, switches and guards cut apart .....	9.75 to 10.25
Per Net Ton.	
Iron angle bars .....	\$10.00 to \$10.50
Steel angle bars .....	8.50 to 9.00
Iron car axles .....	17.00 to 17.50
Steel car axles .....	13.00 to 13.50
Wrought arch bars and transoms .....	12.00 to 12.50
No. 1 railroad wrought .....	9.00 to 9.50
No. 2 railroad wrought .....	8.00 to 8.50
Railroad springs .....	8.50 to 9.00
Steel couplers and knuckles .....	8.50 to 9.00
Locomotive tires, smooth .....	9.50 to 10.00
No. 1 dealers' forge .....	7.50 to 8.00
Mixed borings .....	3.00 to 3.50
No. 1 busheling .....	8.00 to 8.50
No. 1 boilers, cut to sheets and rings .....	5.00 to 5.50
No. 1 cast scrap .....	9.00 to 9.50
Stove plate and light cast scrap .....	7.50 to 8.00
Railroad malleable .....	7.50 to 8.00
Agricultural malleable .....	6.50 to 7.00
Pipes and flues .....	5.50 to 6.00
Railroad sheet and tank scrap .....	5.50 to 6.00
Railroad grate bars .....	6.00 to 6.50
Machine shop turnings .....	4.50 to 5.00
Bundled sheet scrap .....	4.00 to 4.50

**Coke.**—Transactions have been altogether in small lots, commanding a slightly better price than contract business of size. By-product coke is selling on the basis of Connellsville quotations.

**Finished Iron and Steel.**—Salesmen are competing keenly for new business and structural prices may be conservatively put at 1.35c., with even 1.30c. when any considerable quantity is sought. Most fabricating shops have fair stocks on hand, though a steady flow of new work, which is keeping them quite busy, all things considered, is likely to draw them into the market if the consumption shows no further diminution. In bars, both reinforcing and ordinary, the consumption is keeping up to shipments and prices are held fairly steady. Light rails are in very good demand from the coal interests, while the lumber interests have been in the market to some extent. Track fastenings are in fair request. Plates are weak, with little doing.

## Chicago

CHICAGO, ILL., November 10, 1913.

The bar mills at Bay View are practically shut down; at Joliet but few departments of the mills are in operation, and at South Chicago and Gary running is intermittent and the blowing out of a blast furnace and reduced working crews have cut production close to the 50 per cent. mark. This tangible evidence of a continued lack of new orders is offset by but few aspects of the market of more cheerful character. The purchase of 47,500 tons of rails by the Louisville & Nashville Railroad from the Tennessee Coal, Iron & Railroad Company followed its inquiry with gratifying promptness. But railroad buying is scattered, gives no immediate promise of becoming sustained in volume and is restricted to unavoidable purchases. Agricultural implement interests regard their own outlook for business as exceedingly uncertain and are confirming this uncertainty by holding their specifications to the mills down to a minimum. Steel bar orders are in fact particularly scarce. In structural material the week's tonnage is reported to have shown some improvement. Rumors of marked concessions in prices are rife, but reliable reports indicate that the local market is still on the upper side of the 1.30c. Pittsburgh basis. Quotations for sheets have yielded an additional dollar per ton under pressure and local jobbers have reduced store quotations on plates, shapes, sheets and bars, \$2 per ton. The pig-iron market is exceedingly quiet, but as yet a softening of the market has not openly appeared. On the other hand, some grades of Southern iron are scarce. Recent sales of scrap have brought out prices below our last quotations.

**Pig Iron.**—Melters of pig iron in this territory have as yet shown no disposition to provide for their first-half requirements. On the contrary the only business being placed consists of carload and small lots up to a few hundred tons, which are obviously calculated to meet the buyers' situation for the present, enabling them to delay the time of contracting. It is significant that while sales of pig iron have gradually tapered off in volume from a high point in July to a minimum in October, shipments have increased and none of the furnaces appear to be experiencing difficulty with their customers regarding the taking out of iron. An agricultural implement interest at Rockford bought 300 tons of foundry iron and a St. Louis stove foundry is in the market for something less than 1000 tons, probably of Southern iron. The restricted capacity in blast in the South has resulted in a scarcity of some of the better grades of iron for prompt shipment despite the generally light demand. For No. 2 Southern iron \$11.50 Birmingham continues the prevailing quotation. Lake iron is held at \$15 f.o.b. furnace. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4 .....	\$15.25 to \$15.75
Northern coke foundry, No. 1 .....	15.50 to 16.00
Northern coke foundry, No. 2 .....	15.00 to 15.50
Northern coke foundry, No. 3 .....	14.50 to 15.00
Southern coke, No. 1 foundry and No. 1 soft .....	16.35 to 16.85
Southern coke, No. 2 foundry and No. 2 soft .....	15.85 to 16.35
Southern coke, No. 3 .....	15.35 to 15.85
Southern coke, No. 4 .....	14.85 to 15.35
Southern gray forge .....	14.85 to 15.35
Southern mottled .....	14.35 to 14.85
Malleable Bessemer .....	15.00 to 15.50
Standard Bessemer .....	15.00 to 15.50
Basic .....	15.00 to 15.50
Jackson Co. and Kentucky silvery, 6 per cent. ....	19.40
Jackson Co. and Kentucky silvery, 8 per cent. ....	18.40
Jackson Co. and Kentucky silvery, 10 per cent. ....	20.40

**Rails and Track Supplies.**—The order for 47,500 tons of rails for the Louisville & Nashville Railroad was placed with the Tennessee Coal, Iron & Railroad Company and constituted the week's only rail transaction of importance for which figures were asked in this market. The Northern Pacific Railway closed its requirements of tie plates, but the Burlington system did not complete its purchases of track equipment as was expected. Concerning its rail needs, it is reported of the Chicago, Milwaukee & St. Paul that a considerable tonnage of rails is being carried over into 1914 and the question of additional purchases is not being considered. We now quote standard railroad spikes at 1.65c. to 1.70c., base; track bolts with square nuts, 2.10c. to 2.15c., base, all in carload lots, Chicago; tie plates, \$30 to \$32, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 10 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.30c., Chicago.

**Structural Material.**—Some of the local mills report that structural tonnage emanating from miscellaneous sources and including orders from car builders aggregated larger bookings than for several weeks past. Market conditions as to price have not changed appreciably from a week ago and quotations range from 1.53c. down to 1.48c., Chicago. Fabricators have a great amount of work on their books and what they have is a scattering of miscellaneous jobs. Prices for fabricated steel are reported as unsatisfactory. Contracts for steel noted carried a total of 1836 tons of which the largest single item was 616 tons for the Mount Wilson Solar Observatory at Pasadena, awarded to Milliken Brothers. The American Bridge Company will furnish 272 tons for the Twelfth Street Traffic Way at Kansas City, 473 tons for the Heywood Bros. & Wakefield Company at Chicago and 115 tons for the Ashton Theater Company at Provo, Utah. The contract for 360 tons for the Normal school at Marquette, Mich., has also been let. We quote for Chicago delivery from mill, 1.48c. to 1.53c.

Paralleling the lower mill prices local jobbers have reduced their quotations \$2 per ton on shapes out of store. We quote for Chicago delivery from store 1.85c.

**Plates.**—Orders for universal mill plates are in fair volume but sheared plate specifications are decidedly tight. There is apparently less resisting power among the makers of plates than among the mills rolling the other principal products and the rumors of extreme concessions have to do with plates very largely. We continue to quote Chicago delivery from mill 1.48c. to 1.53c.

In the marked absence of mill contracting the jobbers are benefiting by the hand to mouth buying policy with which so many consumers are satisfying their requirements. This is true for other lines as well as plates. We have revised our quotations on plates out of store and quote 1.85c.

**Bars.**—One of the local mills finds that specifications for bar iron the first week of November exceed the specifications of the similar period in October by an average of 100 tons a day. This business is entirely of a miscellaneous character and its sources are distributed among various manufacturers and railroads. Prices have remained stationary largely because some of the mills have been content to operate at much less than capacity rather than to seek new business aggressively. For steel bars specifications are lighter than on other finished products, but in the matter of price the position of the mills is probably firmer than in any other direction. Sales of hard steel bars have fallen off and price concessions of \$1 and \$2 a ton are prevailing. The contract for about 300 tons of reinforcing bars for the Terminal Arcade, Kansas City, was placed. We quote for mill shipment as follows: Bar iron, 1.15c. to 1.20c.; soft steel bars, 1.48c. to 1.58c.; hard steel bars, 1.35c. to 1.40c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

Store prices for iron and steel bars have been reduced \$2 a ton and we quote for Chicago delivery soft steel bars 1.75c.; bar iron, 1.75c.; reinforcing bars, 1.75c. base, with 5c. extra for twisting in sizes 1½ in. and over, and usual card extras for smaller sizes; shafting 55 per cent. off.

**Sheets.**—The necessities of the smaller mills whose only recourse for securing business in a situation like the present lies in offering the inducement of lower prices, are responsible for an additional decline of \$1 a ton in both black and galvanized. Business in carload lots is not entirely lacking but neither manufacturers nor jobbers are contracting for future delivery. The impression prevails among users of sheets that minimum prices previously attained should be the basis for new contracting. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.73c.; No. 28 black, 2.13c. to 2.18c.; No. 28 galvanized, 3.13c. to 3.18c.

New prices on sheets out of store are given in the following quotations for Chicago delivery: No. 10 blue annealed, 2.05c.; No. 28 black, 2.65c.; No. 28 galvanized, 3.70c.

**Rivets and Bolts.**—One of the trunk lines of the Northwest is receiving quotations on its requirements of machine bolts, the inquiry covering about 300,000 pieces. In other directions the market is decidedly quiet. The demand for rivets has not improved and prices as low as 1.90c., Chicago, have been made. We quote from mill as follows: Carriage bolts up to ¾ x 6 in., rolled thread, 80-2½; cut thread, 75-17½; larger sizes, 70-15; machine bolts up to ¾ x 4 in., rolled thread, 80-7½; cut thread, 80-2½; large size, 75-2½; coach screws, 80-10-10; hot pressed nuts, square head, \$6 off per cwt.; hexagon, \$6.70 off per cwt. Structural rivets, ¾ to 1¼ in., 1.98c. to 2.03c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ¾ x 4 in., 70-5-10; larger sizes, 70-7½; carriage bolts up to ¾ x 6 in., 75-5; larger sizes, 70-7½ off. Hot pressed nuts, square head, \$5.50, and hexagon, \$6.20 off per cwt.

**Wire Products.**—Current business in wire products is moving very slowly and inquiry is so scattered that it is not apparent whether further concessions in price at this time would bring out more liberal specifications. Prices are unchanged and we quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78; galvanized, \$2.15; polished staples, \$1.78; galvanized, \$2.10, all Chicago.

**Cast-Iron Pipe.**—New inquiries for cast-iron pipe for municipal installation are still very scarce, the only letting of importance being 500 tons for Beatrice, Neb., bids closing on November 19. United States Cast Iron Pipe & Foundry Company has taken an order for 2000 tons of pipe for the Southern Pacific Railway. We quote as follows, per net ton, Chicago: Water pipe, 4-in., \$28; 6 to 12-in., \$26; 16-in. and up, \$25, with \$1 extra for gas pipe.

**Old Material.**—The liberal offerings of scrap in this market during the past week through dealers has led to the impression that the selling of old material by the Atchison, Topeka & Santa Fe Railway was in much larger volume than appeared on its list of a week ago. Coincident with the appearance of a liberal available supply, prices for nearly all grades are at least 25 cents a ton lower. Both steel scrap and rolling mill grades are decidedly weak. Additional railroad offerings include 2000 tons by the Chicago, Milwaukee & St. Paul, of which 500 tons is No. 1 steel rail; 4200 tons by the Illinois Central, of which 1500 tons is No. 1 wrought; 800 tons by the Soo Line; 800 tons by the Toledo, St. Louis & Western, and 1100 tons by the Chicago, St. Paul, Minneapolis & Omaha. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	\$13.50 to \$14.00
Old steel rails, rerolling	12.00 to 12.50
Old steel rails, less than 3 ft.	11.00 to 11.50
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	12.00
Heavy melting steel scrap	9.50 to 10.00
Frogs, switches and guards, cut apart	9.50 to 10.00
Shoveling steel	8.75 to 9.25
Steel axles turnings	6.75 to 7.25
Per Net Ton.	
Iron angles and splice bars	\$12.50 to \$13.00
Iron arch bars and transoms	12.50 to 13.00
Steel angle bars	8.50 to 9.00
Iron car axles	20.00 to 20.50
Steel car axles	13.50 to 14.00
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.25 to 8.50
Cut forge	8.25 to 8.50
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.50 to 10.00
Locomotive tires, smooth	10.50 to 11.00
Machine shop turnings	4.50 to 4.75
Cast borings	4.25 to 4.75
No. 1 busheling	7.75 to 8.00
No. 2 busheling	6.00 to 6.50
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	10.25 to 10.75
No. 1 cast scrap	10.00 to 10.50
Stove plate and light cast scrap	9.25 to 9.75
Railroad malleable	9.25 to 9.75
Agricultural malleable	8.50 to 9.00
Pipes and flues	6.75 to 7.25

## New York

NEW YORK, November 12, 1913.

**Pig Iron.**—An inquiry for 5500 tons of three grades of iron for first half shipment from a New England foundry excited the market the past week. It is understood that about 3000 tons went to a Buffalo interest at a price equal to about \$13.50 for No. 2 X at furnace, while a portion of it, calling for high phosphorus, went to an eastern Pennsylvania furnace. Other than this no new business of any moment has transpired. Further inquiry for forward delivery is coming out, running

close to 10,000 tons. Pig-iron consumers are not only taking shipments regularly as per contract, but a noteworthy number are asking that delivery terms be anticipated. As contracts must necessarily expire within a few weeks, sellers are expecting a revival of buying within a reasonable time. Foreign pig iron has so far cut no figure in this market, although British quotations are being closely studied. Quotations may be regarded as nominal, as concessions can be secured on fair-sized purchases. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$16 to \$16.25; No. 2 X, \$15.75 to \$16; No. 2 plain, \$15.50. Southern iron is quoted at \$15.75 to \$16.25 for No. 1 foundry and \$15.25 to \$15.75 for No. 2.

**Finished Iron and Steel.**—The market is exceedingly quiet. That prices are weak is undeniable, but they reflect concessions in other centers where doubtless occasional large size transactions have had much to do with the downward revision. In plates, for example, admitting that New York is not now a center for large volume business in plates, much of the going business is done at 1.35c., base, Pittsburgh with considerable even at 1.40c. For large lots 1.30c., Pittsburgh, is of course obtained, and this is true of plain structural material, with a general belief indeed that a large attractive offering would fetch 1.25c., Pittsburgh. As respects rumors of shapes going at less than 1.30c., it may be said that one jobber claims to a purchase of 200 tons at 1.25c., Pittsburgh, but the sellers interviewed name 1.30c. and 1.35c. as the minimum. Steel bars have been sold in this market for 1.35c., Pittsburgh, but no information was obtained of any transactions at 1.30c. Bar iron is dull and weak, but no change is made in the quotations. As was the case last week there is very little structural work pending outside of the subway work, for which there will shortly be about 80,000 tons before the trade. In this work, there are claims that the plain material will go at unusually low prices; but the large volume involved, the possibility that as much as two years may transpire before completion of the different contracts and the fabricating capacity of the four concerns chiefly interested are not calculated to lead to knifing competition for the material or its fabrication. Of the structural jobs closed mention may be made of about 700 tons for the Brixton apartment house East Seventy-ninth street, awarded to the Hinkle Iron Works; 800 tons for a loft building, Washington, D. C., for the Washington New Theater Company, to the Phoenix Bridge Works; 300 tons for an apartment house, Park avenue, taken by the Radley Steel Construction Company; 100 tons for an extension to the J. G. Brill plant, Philadelphia, taken by Lewis F. Shoemaker & Co., and 150 tons for a cold storage building in Boston to the McClintic-Marshall Construction Company. We quote mill shipments of plain material and plates at 1.30c. to 1.35c., Pittsburgh, or 1.40c. to 1.51c., New York, and steel bars at 1.35c. to 1.40c., Pittsburgh, or 1.51c. to 1.56c., Pittsburgh. Bar iron appears to range still between 1.30c. to 1.45c. New York, with the bulk of the better iron going at 1.35c., and store prices are 1.95c. to 2.05c. for steel bars and 2c. to 2.10c. for iron bars and steel plates and shapes.

**Old Material.**—Small lots of heavy melting steel scrap have been sold at \$10.50, delivered in eastern Pennsylvania, and some little business has been done in cast scrap for foundry use. Rolling mills have bought scarcely anything in this market in the past week. The railroad lists out for this month present about the usual quantities of old material, but dealers are so discouraged with the present situation that they will probably not compete sharply with consumers for these offerings. Quotations are continued as follows per gross ton, New York:

Old girder and T-rails for melting.....	\$8.00 to	\$8.50
Heavy melting steel scrap .....	8.00 to	8.50
Relaying rails .....	20.50 to	21.00
Rerolling rails .....	11.00 to	11.50
Iron car axles .....	20.50 to	21.50
Steel car axles .....	14.00 to	15.00
No. 1 railroad wrought .....	11.00 to	11.50
Wrought iron track scrap .....	10.00 to	10.50
No. 1 yard wrought, long .....	9.50 to	10.00
No. 1 yard wrought, short .....	8.50 to	9.00
Light iron .....	3.50 to	4.00
Cast borings .....	4.50 to	5.00
Wrought turnings .....	4.50 to	5.00
Wrought pipe .....	8.00 to	8.50
Carwheels .....	11.00 to	11.50
No. 1 heavy cast, broken up.....	11.00 to	11.50
Stove plate .....	8.25 to	8.75
Locomotive grate bars .....	7.50 to	8.00
Malleable cast .....	8.00 to	8.50

**Ferroalloys.**—With the exception of a few sales of small lots of 80 per cent. ferromanganese, the market is without activity, and the same conditions prevail in regard to ferrosilicon. The producers' price for ferro-

manganese remains at \$50, Baltimore. Quotations for 50 per cent. ferrosilicon are still \$75, Pittsburgh, for carloads; \$74 for 100 tons, and \$73 for 600 tons and over.

**Cast-Iron Pipe.**—With the passage of the pipe-laying season, this branch of trade is now in its usual quiet condition, awaiting the appearance of buying for spring delivery. No public lettings of any importance are in sight and private buyers are doing little in the market. Makers continue to quote \$23 to \$23.50 per net ton, tidewater, New York, on carload lots of 6 in.

## Metal Market

NEW YORK, November 12, 1913.

### The Week's Prices

Cents Per Pound for Early Delivery.									
Copper, New York		Electro-lytic, New York		Tin, New York		Lead, New York		Spelter, New York	
Nov.	Lake.								
6.....	16.75	16.25	39.90	4.35	4.20	5.35	5.20		
7.....	16.62½	16.00	39.90	4.35	4.20	5.35	5.20		
8.....	16.62½	16.00	.....	4.35	4.20	5.35	5.20		
10.....	16.50	15.75	39.30	4.35	4.20	5.30	5.15		
11.....	16.50	15.75	39.25	4.35	4.20	5.30	5.15		
12.....	16.25	15.50	39.50	4.35	4.20	5.30	5.15		

Offerings of copper are much lower, but consumers continue to stay out of the market. There has been a slightly improved buying of tin at lower prices. Lead is unchanged as to price and otherwise. Spelter is dull and down a few points. Antimony is uninteresting.

### New York

**Copper.**—The market has developed no small degree of softness. Nominal quotations to-day are 15.50c. cash, for electrolytic and 16.25c. for Lake. In the latter there has been no action of any kind, though in electrolytic there have been offerings at the price mentioned. The market has been affected to a considerable extent by rumors that the big agencies were considering a reduction to 16c., 30 days, delivered. This report was helped along by rumors that they had offered to sell to Europe on a basis of 16c., f.o.b. These reports were not confirmed, however, and to all outside appearances the big sellers are adhering to 16.75c., cash, New York, but some of them are openly anxious to get business. Since November 1 the price in London has declined 2½, which is equivalent to 1½c., and it is declared that the pegged price cannot hold in view of the foreign situation and the fact that domestic holders of resale copper are eager to sell. The producers' statement for October, which came out November 7, showing an increase in stocks of nearly 3,000,000 lb., excited very little comment. Slow and uncertain as the situation is, it remains a fact that many consumers are not supplied for December. The question is as to their manner of buying when they start, and conservative ones in the trade believe it will be on a hand-to-mouth basis rather than a heavy movement. London quotations to-day are 16p 15s. for spot and 16p 7s. for futures. The exports this month total 10,547 tons.

**Pig Tin.**—In the latter part of last week the market was quiet, but this week has seen some improvement with the demand mostly for 5, 10 and 15-ton lots from consumers who want quick shipments, a situation which indicates that the stocks of some of them are running low. This last-named condition is one which has been expected by the trade and has caused it to indulge in some mental speculation, taking the supply into account. It is pointed out that stocks on November 1 were 2357 tons, that 1290 tons has arrived this month and that 400 tons is a fair allowance for scattering lots, which makes the total amount available about 4000 tons. If a good demand should develop, as seems possible, there may be a slight squeeze in the metal. The tin-plate industry has been backward in buying, partly due, it is supposed, to the fact that they are not receiving specifications as abundantly as was expected. Tin is quoted to-day as 39.50c. and was down to 39.25c. yesterday. London to-day quotes spot at £179 15s. and futures at £181 5s. There is afloat 1225 tons.

**Lead.**—The situation has continued rather quiet and generally without change from that of a week ago. What business was done has been at 4.35c., New York and 4.20c., St. Louis, which prevailed to-day.

**Spelter.**—Dullness has been the rule and prices have dropped a few points, quotations to-day being 4.30c., New York, and 5.15c., St. Louis, with the probability of these figures being shaded. It is evident that consumption is less.

Antimony.—In a dull market quotations are 7.25c. to 7.50c. for Hallett's, 7.50c. to 7.60c., for Cookson's, and 7.50c. to 7.60c. for Chinese and Hungarian grades.

Old Metals.—The market is lower. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	15.00 to 15.25
Copper, heavy and wire	14.50 to 14.75
Copper, light and bottoms	13.25 to 13.50
Brass, heavy	9.50 to 9.75
Brass, light	8.00 to 8.25
Heavy machine composition	13.25 to 13.50
Clean brass turnings	8.75 to 9.00
Composition turnings	11.75 to 12.00
Lead, heavy	4.25
Lead, tin	4.00
Zinc, scrap	4.37½

#### Chicago

NOVEMBER 10.—General market conditions on non-ferrous metals are far from satisfactory. Copper sales are light and while quotations from the principal reducers remain unchanged small concessions from outside sources are not lacking. We quote as follows: Casting copper, 16.75c.; Lake copper, 17c. to 17.25c., for prompt shipment; small lots, ¼c. to ½c. higher; pig tin, carloads, 40.50c.; small lots, 42.50c.; lead, desilverized, 4.30c. to 4.35c. and corroding, 4.45c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.25c. to 5.30c.; Cookson's antimony, 9.50c.; other grades, 8c.; sheet zinc, \$7.50, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. sacks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 14c.; copper bottoms, 12.50c.; copper clips, 13.25c.; red brass, 12.50c.; yellow brass, 9c.; lead pipe, 3.75c.; zinc, 3.75c.; pewter, No. 1, 25c.; tin foil, 32.50c.; block tin pipe, 33c.

#### St. Louis

NOVEMBER 10.—After a slight improvement in the early part of the past week there was a recession, which although not large served to depress conditions. Lead is now quotable at 4.22½c.; spelter, 5.22½c. to 5.25c.; Lake copper, 17c. to 17.60c.; electrolytic copper, 16.60c. to 17.22½c.; tin, 40.10c. to 40.35c.; Cookson's antimony, 9.50c. In the Joplin zinc ore market there was a stronger feeling as a result of the higher metal prices of the early part of the week, and the price range was \$40 to \$43.50 per ton for 60 per cent., with the bulk of the selling at \$42.50 and the top settlement at \$46.50. Calamine was in good demand at \$21 to \$22, 40 per cent. basis, the top settlement reaching \$26. The lead ore market was quiet at \$52 for 80 per cent. On miscellaneous scrap metals we quote as follows: Light brass, 5.50c.; heavy brass and light copper, 10c.; heavy copper and copper wire, 11.50c.; pewter, 24c.; tin foil, 28c.; zinc, 2.75c.; lead, 3c.; tea lead, 2.75c.

## Iron and Industrial Stocks

NEW YORK, November 12, 1913.

The Mexican situation has largely dominated the course of prices on securities. Stocks have fallen as intervention by this country seemed imminent and have risen with the appearance of reassuring statements from Washington. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can. com.	25¼-31	Railway Spring, com.	23-24
Am. Can. pref.	87-90¼	Railway Spring, pref.	94
Am. Car & Fdy. com.	42-43¼	Republic, com.	18¼-19
Am. Car & Fdy. pref.	112¼-113	Republic, pref.	78¼-80
Am. Loco. com.	29-30	Rumely Co., com.	187½
Am. Loco. pref.	96	Rumely Co., pref.	45-45½
Am. Steel Foundries	26-27	Pipe, com.	10¼
Am. Steel, com.	40	U. S. Steel, com.	53¼-56¼
Am. Steel, pref.	28¼-30¼	U. S. Steel, pref.	104¼-105¼
Ad. Steel, pref.	70-71	Va. I. C. & Coke	40¼-42¼
Colorado Fuel	25¼-28¼	Westinghouse Elec.	63¼-66¼
Deere & Co., pref.	97¼-98	Am. Ship, com.	28
General Electric	138¼-140	Am. Ship, pref.	82¼-86
Ill. S. Ore Cert.	31-32	Chic. Pneum. Tool	50-51¼
Int. Harv. com.	102-103	Cambria Steel	47¼-48¼
Int. Harv. Corp.	101¼-101½	Lake Sup. Corp.	22¼-23¼
Int. Pump, com.	6¼	Pa. Steel, pref.	64
Int. Pump, pref.	22-23¼	Warwick	10
Int. En. & St. com.	10¼-10½	Crucible Steel, com.	15¼-15½
Int. En. & St. pref.	80	Crucible Steel, pref.	89-89¼
Pressed Steel, com.	24-25		

#### Dividends Declared

The Niles-Bement-Pond Company, regular quarterly, 1½ per cent. on the preferred stock, payable November 15.

The Pratt & Whitney Company, regular quarterly, 4 per cent. on the preferred stock, payable November

Deere & Co., regular quarterly, 1¼ per cent. on the preferred stock, payable December 1.

American Steel Foundries, regular quarterly, ½ of 1 per cent. payable December 31.

The International Harvester Corporation, regular quarterly, 1¼ per cent. on the preferred stock, payable December 1.

The Commonwealth Steel Company, whose plant is at Granite City, Ill., and which pays its employees with checks, has been placed in the novel position of having to assist in an arrangement of special banking facilities in Granite City on pay days, because of the fact that the payroll, which is in excess of \$110,000, has drained the town's banking resources at such times. In the future, under special arrangements, cash will be available in local banks and elsewhere to cash workmen's checks.

The Modern Machinery & Engineering Company, 1514 Ford Building, Detroit, Mich., has been appointed exclusive selling agent in Canada for the Windsor Machine Company, Windsor, Vt., and the Potter & Johnson Machine Company, Pawtucket, R. I. The Modern Machinery & Engineering Company is the Detroit selling agent of the Potter & Johnson Company. It has opened its Canadian office at 1410 C. P. R. Building, Toronto, in charge of Edward C. Roelofson.

The Miller Metal Works Company, which has been conducting a plant in Jersey City, N. J., will move to Toledo, Ohio, and will hereafter be known as the General Metal Works Company. A site with two large factory buildings, on the Wheeling & Lake Erie Railroad and East Broadway, has been purchased. The company will make tubular parts for automobiles and metal parts for various purposes.

The W. E. Shipley Machinery Company has moved its offices from the Bourse Building to the Morris Building, 1421 Chestnut street, Philadelphia. The machines formerly shown at the Bourse are now on exhibition at the company's warehouse, near Sixteenth and Callowhill streets, where stock sizes will also be carried of various types of machine tools for prompt shipment.

The American Die & Tool Company, Reading, Pa., has elected W. E. Farrell president and D. Sternbergh secretary, treasurer and general manager. It is announced that there will be no change in the policy or business of the company, which will continue the manufacture of gears, transmissions, punches, dies and duplicate parts for general machinery.

The Otis Steel Company, Cleveland, Ohio, has placed a contract with the Cleveland office of the General Electric Company for electric controllers for the mills and cranes in its new steel plant. This practically completes the purchase of the electrical equipment of the plant, which has all been placed with the General Electric Company.

The Pittsburgh-Westmoreland Coal Company, Pittsburgh, Pa., has issued an impressive pamphlet entitled "Currency and Banking," with graphics, by H. A. Kuhn, covering statistics of numerous financial and economical subjects. This is an extremely interesting publication and has a timely interest in view of pending legislation.

The National Company is the name of the new establishment at Waterbury, Conn., which is erecting a plant for the manufacture of small brass tubing. An error was made in giving the name as National Mfg. Company, on page 945 of *The Iron Age* of October 23, 1913.

The Chicago Pneumatic Tool Company, Chicago, is removing its general offices from the Fisher Building to the thirteenth floor of the Transportation Building at Harrison and Van Buren streets, Chicago.

## Trade Publications

**Press Guard and Electric Welding Machines.**—Geuder, Paeschke & Frey Company, Milwaukee, Wis. Folder and pamphlet. In the first illustrations and descriptive matter explain the operation of the Cream City accident preventor, which is designed for use on punching, stamping and forming presses and similar treadle-operated machines. An illustrated description of this device appeared in *The Iron Age*, May 4, 1911. The pamphlet deals with a line of spot and butt welding machines which are designed for power drive and are operated by foot or hand power.

**Time Switch.**—Leslie C. Dorland, Poughkeepsie, N. Y. Pamphlet. Describes and illustrates an automatic time switch which can be used for regulating store and sign lighting and the charging of storage batteries. Exterior and detail views of the device are given, together with instructions for installing and operating it.

**Heat Treating.**—C. U. Scott, Davenport, Iowa. Folder. Calls attention to the service which can be rendered by this plant in the carbonizing, case hardening, heating, treating, brazing, bluing, tinning and galvanizing of metal. A view of the plant is given and there is a brief statement of the equipment and its capacity.

**Grease Cups.**—William Powell Company, Cincinnati, Ohio. Pamphlet. Illustrates a line of grease cups of the automatic type, which can be used for various purposes. Brief descriptions of the cups, including mention of the fields for which they are designed, with a brief specification table, are given for each style.

**Air Compressor.**—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. 34-T. Devoted to the class M Corliss type of steam-driven air compressors. Line drawings showing the general arrangement of these compressors and condensed specification tables are first presented, followed by a description of the various features of the compressors. Data on the several sizes of vertical and horizontal types of air receivers are also included.

**Internal Combustion Engines.**—Fuller & Johnson Mfg. Company, Madison, Wis. Catalogues Nos. 10, 17, 18 and 19. Give general descriptions and specifications for various types of internal combustion engines of the vertical and horizontal types. These engines employ the open water jacket system of cooling and burn any ordinary type of liquid fuel. The construction of these engines, which are built in sizes ranging from 1½ to 20 hp., is gone into at some length, the text being supplemented by numerous engravings. A feature of the catalogues is the presentation of the engines in use for various classes of service.

**Pneumatic Tools and Appliances.**—Wiener Machinery Company, 50 Church street, New York. Circular P-15. Describes a line of pneumatic tools manufactured by Pokorny & Witekand, Frankfurt, Germany, for which this company has the general agency for the United States, Canada and Cuba. The tools listed include riveting, chipping and calking hammers, jam riveters and pneumatic holders on and sand and concrete rammers. The general construction of these tools is described, followed by illustrations with condensed specification tables of the different ones.

**Metal Working Machinery and Tools.**—Gisholt Machine Company, Madison, Wis. Four catalogues. Lists an extensive line of metal working machinery and tools, which includes boring mills, turret lathes, a tool grinding machine and adjustable reamers. The various machines are illustrated and described and tables of some of the principal dimensions are given. The different classes of work which can be handled by these machines are given, together with considerable useful information regarding their installation, operation and output.

**Ball Finishing Tools and Tube Welding Machines.**—Draper Mfg. Company, Port Huron, Mich. Two folders. Concerned with a line of tools for repairing the ball joints of superheaters and pneumatic flue and tube welding machines for scarfing, welding and swedging locomotive boiler and superheater tubes. Illustrations and descriptions of all of these appliances are given, together with a partial list of users.

**Chucks.**—Hoggson & Pettis Mfg. Company, New Haven, Conn. Pamphlet. Devoted to the Sweetland lathe chucks which are made with reversible jaws in three types. The various features sought in chuck construction are given, followed by illustrations with brief descriptions of the different styles. One of the features of the chuck upon which special emphasis is laid is the fact that all of the screws and pinions are flush with the chuck body, thus protecting the operator from injury.

**Portable Electric Drilling Machines.**—Independent Pneumatic Tool Company, Thor Building, Chicago, Ill. Circular T. Calls attention to a light portable electric tool for the drilling of small holes in metal and wood. This machine can be used on either 110 or 220 volts, direct-current or single-phase circuits, the power being supplied from the nearest lighting socket. A view of the drill is given, together with a brief description and a condensed specification table.

**Oil Separators.**—Harrison Safety Boiler Works, North Philadelphia Station, Philadelphia, Pa. Section E of catalogue No. 550. Pertains to a line of low-pressure receiver oil separators for use in purifying engine exhaust steam which is to be utilized in low-pres-

sure or mixed-flow turbines. These separators are used to prevent oil in the exhaust from fouling the turbine blades and passages and the condenser tubes and rendering the condensate unfit for boiler feed and also to remove the water of condensation formed in the engine from the exhaust steam. These separators have extra large wells or receivers which serve as storage vessels for the water until it can be drained away by the traps, and also act as mufflers to smooth out the pulsations in the flow of steam from the engine.

**Rail Welding.**—Goldschmidt Thermit Company, 90 West street, New York City. Pamphlet No. 12. Describes and illustrates rail welding by the Thermit process and calls particular attention to a new insert method of welding, which is described in detail. A number of views of other repairs made by this process are also included.

**Water Tube Boilers.**—Heine Safety Boiler Company, St. Louis, Mo. Pamphlet. Contains a reprint of a paper read before the Associated Engineering Societies of St. Louis on the space occupied by water tube boilers, with particular reference to the economies that are made possible by the use of this class of boilers.

**Air Compressors.**—Bury Compressor Company, Erie, Pa. Catalogues Nos. 40 and 41. Illustrate a line of air compressors which are built in both the single and duplex types for all classes of service. The single machines are described in catalogue No. 40 while the other one covers the duplex line. In both catalogues complete descriptions of the general construction of the machines are given, followed by numerous illustrations and tables of specifications.

**Soot Cleaner.**—Vulcan Soot Cleaner Company, Du Bois, Pa. G. L. Simonds & Co., 115 South La Salle street, Chicago, Ill., sole agents. Pamphlet. Is a presentation of soot cleaning as applied to all types of water tube and return tubular boilers with especial reference to the Vulcan system. There are a number of line drawings showing the way in which this device is applied to boilers and the principle upon which it operates, and there are numerous halftone engravings showing power plants in which it has been installed.

**Ball Bearings.**—J. S. Bretz Company, 250 West Fifty-fourth street, New York City. Pamphlet. Illustrates the various types of F & S annular ball bearings and gives dimension diagrams for the light, medium, heavy and narrow types. The outer diameter, hole width, ball diameter, number of balls and the load in pounds at various speeds are given for each bearing.

**Bearing Metals.**—Lumen Bearing Company, Buffalo, N. Y. Booklet. Concerned with a line of bronze bearings for machine tools and machinery in general. Specifications and brief descriptions are given for five different alloys and a number of typical applications of them are mentioned. In addition to the bearing metals listed in the booklet, the company is prepared to furnish various other alloys for specific purposes, the list including yellow brass, aluminum alloys and several phosphor bronzes.

**Two-Spindle Lathe.**—J. J. McCabe, 30 Church street, New York City. Folder. Shows the lathe as built with swings of 24 and 48 in. for turning car wheels. This tool has been redesigned, the bed having been made deeper, and is now provided with a wheel turning rest and a wheel holding attachment.

**Generating Sets.**—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Mailing card. Refers to the company's vertical type of direct-connected generating sets which can be used as the main source of power supply in small shops and mills, or as auxiliary for carrying light loads and thus saving the expense of operating the entire power plant or for relieving the main generator of its peak load.

**Boring Tools.**—W. W. Blakely, 100 Leicester court, Detroit, Mich. Circular. Concerned with a two-part boring tool which can be used in milling, vertical drilling and screw machines, boring mills and lathes for performing all customary boring operations. The construction and use of the tool are gone into briefly and a view is given on the other side.

**Grinding Pans.**—Phillips & McLaren, Pittsburgh, Pa. Bulletin No. 801. Shows a few wet and dry revolving and stationary grinding pans which this company has built for use in brickworks, potteries, sand plants, steel, chemical and glass works, etc. They can be supplied in diameters ranging from 3½ to 10 ft. In addition to the pans shown the company also builds outfits for various conditions, such as grinding in water or grinding iron borings, borundum, foundry ashes, refuse, etc. A partial list of users of the pans is included.

**Gears.**—Philadelphia Gear Works, 1120 Vine street, Philadelphia, Pa. Catalogue. Relates to an extensive line of gears of spur, bevel, internal and worm types, which can be made from any of the customary materials to meet practically any requirements of pitch diameter or face. Views of the various types of gears are given, together with a list of the sizes in which they can be supplied, and there are a number of unillustrated lists, giving the gears which can be made to order. Drawings showing the construction of the company's rawhide gears and pinions are given, together with a number of rules for the laying out of the various forms of teeth included.

**Molders' Tools.**—William Dobson, 211 Spencer street, Coney Island, N. Y. Catalogue No. 14. Calls attention to an extensive line of molders' tools, all of which are illustrated with brief tables of sizes that can be furnished. Considerable useful information is given, including a list of first aid remedies, compositions of various foundry cements and the properties of different alloys.

## Franklin Steel Works to Be Rebuilt

The Franklin Steel Works, whose plant at Franklin, Pa., was destroyed by fire last May, has decided to rebuild. S. Diescher & Sons, consulting engineers, Pittsburgh, have drawn plans for the new works. The old site did not contain enough ground for the new works, which will be on a much larger scale than the old plant, and arrangements were made with the Erie Railroad to move some of its tracks, and also with the city of Franklin by which certain streets will be abandoned. The board of trade of Franklin will secure new rights of way for the Erie Railroad.

Active work on the plant will start in a short time. The main building, of steel, 75 x 700 ft., will house 9, 12 and 18-in. mills. The 9-in. mill will be driven by a 500 hp. motor, while the other two mills will be steam driven, with rope drive. This building will be equipped with two 10-ton electric traveling cranes. A machine shop, of steel construction, will be 45 x 100 ft., equipped with a 5-ton crane, and a blacksmith shop, 25 x 50 ft. The rail shop will be 40 x 60 ft., equipped with a 5-ton electric crane, and the boiler house will be 45½ x 100 ft. The boiler shop will be a steel building, and the contract for its erection has been placed with the Pittsburgh Bridge & Iron Works. The old boilers will be used in this building, as they were not destroyed by the fire, and some additional boiler capacity will be installed. A yard crane runway, for receiving material, will be of 75-ft. span, 500 ft. long, and will be equipped with two 10-ton cranes. This crane runway will be equipped with a 150-ton track scale. There will also be a steel tower and tank for storing water, with a capacity of 500,000 gals.

The output of the company consists largely of shapes for the shops of the Chicago Railway Equipment Company, which owns the concern, transmission poles for power lines, rods for concrete work, shapes for agricultural implements, shapes for iron bedsteads and miscellaneous shapes for the hard steel market. Considerable equipment will be needed for the new works.

## Lake Iron-Ore Shipments in October

The amount of iron ore brought down from the Lake Superior region in October totaled 6,521,854 gross tons, as compared with 7,010,219 tons in October, 1912, a falling off of 488,335 tons. This is the greatest monthly decrease for the season. The following table gives the October and season shipments by ports and the corresponding figures for 1912, all in gross tons:

	October		To Nov. 1	
	1913	1912	1913	1912
Eisenhahn	617,119	652,894	4,914,342	4,663,879
Marquette	369,293	514,753	2,942,897	3,082,331
Ashtabula	497,952	759,716	4,056,754	4,382,877
Superior	2,036,432	2,002,767	12,846,823	13,100,043
Duluth	1,689,427	1,686,324	11,520,153	9,415,511
Two Harbors	1,311,661	1,393,765	9,506,399	8,703,960
	6,521,854	7,010,219	45,787,368	43,348,601

The total shipments to November show an increase of 248,767 tons, or 5.62 per cent. over the figures for the same period in 1912. The percentage for Duluth to November 1 was 25.16 per cent., as compared with 21.72 per cent. last year, while that of the Great Northern Railroad (Superior Dock) was 28.06 per cent., as against 30.12 per cent. last year, a decrease of 2.06 per cent. The decided decrease in the October shipments will likely prevent the season's shipments from reaching 50,000,000 tons, though 40,000,000 tons is looked for.

The American Electrochemical Society, New York Section, will hold a joint meeting with the New York Section of the American Institute of Mining Engineers at the Engineering Societies Building, 29 West Thirty-ninth street, New York, at 8.30 p.m., Thursday, November 20. The subject for the evening is "The Metallurgy of Zinc." George C. Stone, metallurgist, New Jersey Zinc Company, will read a paper on "Progress in the Metallurgy of Zinc"; W. R. Ingalls, editor Engineering and Mining Journal, on "The Electrolytic Smelting of Zinc Ore"; Victor Englehardt, chief engineer, Siemens-Halske Company, on "The Electrolytic Refining of Zinc." A general discussion will follow, several gentlemen familiar with the question having promised to participate.

## Cuban Iron-Ore Deposits

In an article on "Cuban Iron-Ore Reserves" in the Engineering Magazine of November, DeBerniere Whitaker gives the following table of iron-ore properties:

Mayari District		
Spanish-American Iron Company	39,173	600,000,000
Levisa Bay District		
Guantanamo Exploration Company	11,016	70,000,000
Various individuals (estimated)		15,000,000
Moa-Taco District		
Spanish-American Iron Company	45,517	800,000,000
Bethlehem Iron Mines Company (owned and controlled)	33,000	370,000,000
Buena Vista Iron Company	19,841	300,000,000
Guantanamo Exploration Company	7,152	
Eastern Steel Company	10,188	225,000,000
Sociedad Minera Cupey		
Piloto Mining Company (United States Steel Corporation)	15,000	200,000,000
Twenty-five or thirty individuals	55,253	260,000,000
Canagney District		
Bethlehem Iron Mines Company	37,000	400,000,000
Santiago de Cuba District		
Spanish-American Iron Company		3,500,000
Juragua Iron Company		2,500,000
Total		3,246,000,000

Mr. Whitaker states that it is interesting to note that the United States Steel Corporation controls less than 7 per cent. of the total quantity of iron ore listed above.

## German Extras on Rounds

Through the courtesy of Frank Phalen, manager of sales, Republic Iron & Steel Company, New York, we are enabled to present the following list of extras per ton on round bars, as charged by German manufacturers:

¾ to ¾ in.	15s.	(\$3.65)
¾ to 3 ¾ in.	Base	
3 ¾ to 4 in.	5s.	(\$1.22)
4 to 4 ¾ in.	7s. 6d.	(\$1.82½)
4 ¾ to 7 in.	12s. 6d.	(\$3.04)

Hot roll variation is 2 to 4 per cent. On bars ordered to length, allowable variation in length is 1 ft., 6 in. under or 6 in. over; dead lengths, 2 in. variation, 1 in. either way. Extras for above, 4s. (\$0.97) per ton.

The Fitzsimons Company, Youngstown, Ohio, manufacturer of cold-rolled shafting, is distributing to the trade a sheet, 8½ in. by 15½ in., giving a list showing the exact weight of each round cold-rolled shaft from 3/16 in. to 4 15/16 in. diameter, in even lengths from 8 ft. to 24 ft. long. The weights are calculated to the third decimal place in some sizes. This company carries about 5000 tons of finished stock, material suitable for shafting, also special grades of both open-hearth and Bessemer steels for automatic screw machine purposes. The range of sizes carried on rounds is ¾ in. to 10 in., inclusive; hexagons, ¾ in. to 3 in.; squares, ¾ in. to 3½ in.; flats, ¾ in. by 3/16 in. to 1½ in. by 6 in.

President Waddill Catchings, of the Central Foundry Company, 90 West street, New York, states that the report recently published in some journals that "the plants of the company had been closed down since August 16" is not true. The company has seven plants, six of which are in full operation. This company has been authorized by the National Committee of the Federated Supply Associations to use the Naco trademark on extra heavy soil pipe and fittings and is prepared to furnish these products in conformity with the standard specifications adopted by that committee July 11, 1912.

President Clarence H. Howard, of the Commonwealth Steel Company, Granite City, Ill., at a recent banquet to the Commercial clubs of Granite City, Alton, Edwardsville and East St. Louis, in the dining room at the plant, announced that arrangements had been completed for an addition to the works to cost about \$200,000. At the same time it was announced that the company would install a dining room service for its employees by which meals would be served to them at cost.

## Personal

J. E. Matthews, who has represented the Bethlehem Steel Company in England for several years, has been transferred to the company's plant at South Bethlehem, Pa., having been appointed manager of the ordnance department.

Andrew Carnegie will be invited by A. A. Hammer-schlag, director of the Carnegie Institute of Technology at Pittsburgh, to be present on Carnegie day, Tuesday, November 25. The honorary degree of doctor of engineering will be conferred on William McConway, of the McConway-Torley Company, Pittsburgh. The new machinery hall will be dedicated on that day.

Andrew Clark, superintendent of the open-hearth department of the Carnegie Steel Company at Farrell, Pa., has resigned and Ford Corill will succeed him. L. M. Tittler has been appointed superintendent of the open-hearth department at the company's Sharon works.

Arthur Simon, chief engineer of the Cutler-Hammer Mfg. Company, Milwaukee, Wis., is homeward bound after a five months' tour of the industrial districts of Germany.

W. A. Everson, suite 1816 First National Bank Building, Cincinnati, Ohio, has been appointed resident manager of the F. G. Hartwell Coal & Coke Company, whose head offices are in Chicago.

Leo G. Smith, who has been superintendent of the open-hearth works of the Prime Steel Company, Milwaukee, Wis., since March, 1912, was on October 1 made works manager of that plant and also of the company's crucible plant.

George F. Collister, assistant to the general superintendent of the Cleveland Twist Drill Company, Cleveland, Ohio, has been appointed head of the tool steel sales department of the Betz-Pierce Company, Cleveland, sales agent for the tool steel produced by the Colonial Steel Company.

William E. M. Henry, who was for sixteen years auditor of the Cambria Steel Company, and who installed and perfected its accounting and cost system, has opened an office at 1420 Chestnut street, Philadelphia, Pa., for consulting practice in manufacturing accounts and costs.

## Biographical Sketch of James M. Swank

The National Association of Wool Manufacturers, 683 Atlantic avenue, Boston, Mass., has published in its September Bulletin, this being a quarterly periodical, an admirable sketch of James M. Swank, so long the executive head of the American Iron and Steel Association, Philadelphia. The author of the sketch is John Bruce McPherson, who secured the data by personal interviews with Mr. Swank. Accompanying the sketch is an excellent likeness of the subject.

This sketch, while it enumerates Mr. Swank's achievements as an iron and steel statistician, dwells with special emphasis and particularity on his work as an advocate and exponent of protectionist principles. High tribute is given to the part borne by Mr. Swank in the past 40 years in maintaining protection as the dominant theory in tariff revision. The sketch concludes with the following deserved tribute to Mr. Swank:

"He has spent a useful and honorable life. Full of honors and full of years, having lived far beyond the time allotted to the average man, he has asked and has earned relief from the cares and responsibilities of the important position he has so ably and so creditably filled for 40 years. He retires honored at home by all who know the value of his services to the iron and steel industries of his own country, and respected abroad for invaluable statistical and historical work done for these industries in all countries. Antiquarian, historian, economist, statistician—his fame is secure and his name will be cherished and revered wherever the triumphs of the American iron and steel industries in the past century are known and recorded."

The Parish-Ferrell Mfg. Company, Harrisburg, Ill., manufactures exclusively the Never Mire auto jack, and builds no motor cars or trucks, as recently stated in certain publications.

## Obituary

ALEXANDER H. MILLIGAN, widely known in the hardware jobbing trade and among machinery interests, died suddenly from apoplexy at his home in Stamford, Conn., November 3, aged 58 years. He was connected for a long time with the New York office of Dunham, Kerrigan & Hayden, of San Francisco, was subsequently with his brother, Andrew Milligan, in the New York office of Miller, Sloss & Scott, now known as the Pacific Hardware & Steel Company, also of San Francisco, and was later with Manning, Maxwell & Moore and the Fairbanks Company, of New York City. For the past three or four years he had done considerable traveling in Europe in the interests of the Wiley & Russell Mfg. Company, West Haven Mfg. Company, Union Twist Drill Company and Reed Mfg. Company. He leaves a daughter and two sons.

WALLACE BUELL died suddenly, from heart failure, November 7, at his home in Greenwich, Conn., aged 55 years. He was a native of Connecticut, and had been prominently connected with the iron and steel trade. For some years he was vice-president of the Washburn & Moen Mfg. Company, Worcester, Mass. From 1899 to 1903 he was general sales and purchasing agent of the Dominion Iron & Steel Company, Sydney, Nova Scotia. From 1903 to 1908 he was a member of the firm of Buell & Mitchell, 120 Liberty street, New York, conducting a business in iron and steel products and steel construction. Subsequently, for about two years, he was general manager for Abendroth Brothers, Port Chester, N. Y., and since that time had been attending to his private affairs. He leaves a widow and three sons.

WILLIAM A. MCLEOD, senior member of the firm of McLeod, Calver, Copeland & Dike, Boston, Mass., and Washington, D. C., patent lawyers, and recognized as an expert on inventions relating to electrical and textile machinery, died at Dedham, Mass., November 3, aged 57 years. He was president of the Florence Mfg. Company, Northampton, Mass.

EDWARD R. MERRILL, president E. R. Merrill Spring Company, 532 West Twenty-eighth street, New York City, died November 9 at his home in New Rochelle, N. Y., aged 84 years. He served in a Massachusetts regiment through the Civil War.

## Frank Baackes Honored

Royal Mattice, manager of sales of the American Steel & Wire Company, Cincinnati, Ohio, was host at a luncheon given at the Sinton Hotel in that city, November 10, in honor of Frank Baackes, vice-president and general manager of sales of that company. Among the guests present were James I. Stephenson, president Cincinnati Iron & Steel Company; A. G. Belmer, vice-president H. Belmer Company; H. Suydam, president Cincinnati Mfg. Company; William B. Melish, president Bromwell Company; E. W. Greeno, president C. L. Greeno Company; J. B. W. Moeser, president Pickering Hardware Company; J. B. Doan, general manager American Tool Works Company; George Tozzer, purchasing agent Big Four Railroad; Henry Higgin, president Higgin Mfg. Company; C. J. Roenekamp, Enterprise Brass Works; J. B. Swift, president Eagle White Lead Company; W. W. Schueler, Kinney & Bahlman Company; W. A. Scobie, Philip Carey Mfg. Company; A. E. Douglas, E. A. Kinsey Company; W. B. Reedy, president Reedy Elevator Company; Roland Andrews, American Steel & Wire Company; Clifford Wright, Union Trust Company; W. D. Lathrop, president M. A. Hunt Company, and Albert Heekin, president Heekin Can Company.

Under the auspices of the National Association of Manufacturers, on November 11 and 12, a personally conducted inspection was made, by representatives of leading exporters from different parts of the country, of the principal points of interest along the great line of New York piers through which the bulk of American exports find their way abroad. The first day was devoted to a tour along the Hudson and East river piers, and the second day to the Brooklyn piers and the Bush Terminal, and some of the railroad terminals. The tour was in charge of representatives of the export publications and foreign department of the association.

## Pittsburgh and Valleys Business Notes

The United Engineering & Foundry Company, Pittsburgh, has received a contract from the Broken Hill Proprietary Company, New Castle, New South Wales, for a three-stand 28 in.-rail mill, similar in design to a mill installed some years ago by the Jones & Laughlin Steel Company, Pittsburgh, the contract including two traveling tables, cooling beds, runout with saws and a finishing department. This mill is also designed to roll structural steel, but for a time at least will roll only steel rails. A part of the equipment for this order will be made at the Frank Kneeland shops of the United Engineering & Foundry Company, Pittsburgh, and part at its Lloyd-Booth plant at Youngstown, Ohio.

It is probable that a branch plant of the Ford Motor Company, of Detroit, Mich., will be located in Pittsburgh. The company has asked the City Council for the removal of 140 ft. of the handrail on the Atherton avenue bridge, the new building being planned to occupy a site bounded by Morewood, Center and Atherton avenues and the Pennsylvania Railroad. An 11-story reinforced-concrete fire-proof building is contemplated, the property and the building representing an investment of between \$800,000 and \$1,000,000. The proposed building will have a floor space of about eight acres and at the outset the company would employ close to 1000 men. It is to be five stories high to the level of the Atherton avenue bridge and six stories above it. At a level with the bridge it is proposed to establish an elaborate show room.

The Knox Pressed & Welded Steel Company, Pittsburgh, has been licensed to manufacture and sell the pulverized coal equipment developed and patented by B. J. Walker, Erie, Pa., and which has been used for 14 years by the Erie Malleable Iron Company, in connection with metallurgical furnaces and for firing boilers. This new department will be under the management of Edson C. Covert, until recently traveling mechanical engineer of the American Steel Foundries, and who has been connected with the development of pulverized coal in connection with heating and melting furnaces. The Knox Company will manufacture this new line at its plant at Farrell, Pa., which has for some time specialized on welded steel hoppers for pulverized coal installations.

The Blaw Steel Construction Company, Pittsburgh, reports a number of excellent contracts recently taken, among which are the following: Pennsylvania Water & Power Company, Baltimore, for approximately 430 standard towers, together with some special crossing towers, for a transmission line from McCalls Ferry to Baltimore; Penn Central Light & Power Company, Altoona, Pa., 100 standard towers and a number of special towers for a double circuit line; Lake Shore Electric viaduct, Elyria, Ohio, special towers; building for the National Malleable Casting Company, Sharon, Pa.; contract for approximately 1000 tons for work in connection with the Magnolia cut of the Baltimore & Ohio Railroad.

The Cooke-Wilson Electric Supply Company, now located in the Imperial Power building, Pittsburgh, has purchased a site on Rebecca street on the North Side, Pittsburgh, and has made plans for the erection of a new five-story concrete building, which will be used for manufacturing, storage and office purposes.

The Finished Specialty Machine Company, an interest of the Union Drawn Steel Company at Beaver Falls, Pa., has nearly completed the erection of a building to contain pickling and annealing departments and to be equipped with either two or four annealing furnaces. The company states that it will not need any new machinery for these buildings. F. N. Nair, Beaver Falls, is superintendent of the plant.

The J. E. Moss Iron Works has recently built a new plant in Wheeling, W. Va., which has 30,000 sq. ft. of floor space. The company states that it has purchased practically all the machinery that it will need at present with the exception of an air compressor. Its business consists of the manufacture of structural steel work, ornamental iron, fire escapes, iron stairs, elevator inclosures, builders' iron work and fireproofing products, and it has furnished material for some of the largest buildings in West Virginia, including the new Market Auditorium,

National Exchange Bank, Colonial Theater, Bloch Brothers' new factory, Benwood high school, additions to the county court house and others.

The heads of the construction and operating departments of the new open-hearth steel plant of the Pittsburgh Crucible Steel Company at Midland, Pa., described in *The Iron Age* of November 6, includes a number of men formerly connected with other large steel interests. W. H. Baltzell, chief engineer, was for some years with the Shoenberger works of the American Steel & Wire Company. W. G. O'Malley is chief master mechanic. F. D. Egan, formerly at the Homestead works of the Carnegie Steel Company, is electrical engineer. N. C. Harrison is steam and hydraulic engineer. T. J. Driscoll is chief draftsman. W. J. Harris is superintendent of the open-hearth furnaces. Ralph Harris is superintendent of the blooming mills. E. B. Wilkinson, formerly superintendent of the blast furnace of the Carbon Iron & Steel Company at Parryville, Pa., is now superintendent of Midland blast furnace.

No. 4 blast furnace of the Cambria Steel Company at Johnstown, Pa., recently put in blast after being relined and rebuilt, was out of blast only 77 days, the actual rebuilding time being 58 days. The furnace was first blown in in 1883 and was rebuilt in 1898.

The Cavert Wire Company, whose plant was located at Braddock, Pa., some years ago, bought the Tindel-Morris plant at Ellwood City, Pa., which it razed on coming into possession of the property, and on which it has built a modern plant of concrete steel and brick construction. The company manufactures steel wire bale ties (cross-head, hook and single loop), annealed steel baling wire, etc. George B. Cavert is president and treasurer of the company.

Within the past year a demand has arisen for open-hearth steel sheets of superior finish in extra widths. The West Penn Steel Company, Brackenridge, Pa., is meeting this requirement by making sheets of 10 to 22 gauge, 54 in. wide x 96 in. long, either in one pass cold-rolled or full pickled, full cold-rolled, patent leveled, resquared and oiled. The material is used principally in the building of passenger cars, but is adaptable to other purposes.

One of the open-hearth furnaces in the new plant of the Brier Hill Steel Company at Youngstown, Ohio, has been started. The company is now taking orders for 4 x 4 in. open-hearth billets and for sheet bars for December delivery. It is probable that several more furnaces will be started before January 1, but it is not expected that the entire plant will be finished until some time in 1914.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, announces that it will continue its profit-sharing plan for 1914. The company paid its employees about \$300,000 in September on a 6 per cent. basis of net earnings. It paid about \$250,000 in 1912 on a 5 per cent. basis.

At the bi-monthly conference held in Youngstown, Ohio, on Monday, November 10, between representatives of the Republic Iron & Steel Company and the Amalgamated Association, it was found that the average price of iron bars shipped out in September and October was 1.35c., and this means a reduction of 60c. a ton in boiling, or from \$7 to \$6.40 for November and December, and about 6 per cent. to finishers. This is the lowest rate for puddling that has been in effect for some time.

The Thornton Lead and Steel Corporation, Hickory, N. C., has been incorporated under the laws of North Carolina with common stock \$200,000, preferred stock \$300,000, and bonds authorized \$200,000. It will have a branch office in Knoxville, Tenn. It purposes to operate a hydroelectric furnace for reducing iron ore to pig iron on the Catawba River at Hickory. The Bessemer ores to be had for it are located in Lincoln and Burke counties, North Carolina. The hydroelectric plant should be completed by the latter part of next summer. Furnaces for smelting lead ore at Knoxville will be put in operation as soon as possible. They are already constructed and require only a little alteration. The projector is Col. Marcellus E. Thornton, of the Curtis-Thornton Company, builder of bridges and other structural work at Hickory.

# A French View of American Foundries\*

## Observations Made After a Visit to This Country— American Methods and Equipment Superior—Old Methods and Equipment Still Prevalent in France

BY M. BRASSEUR

For some years we have known that America is the country which, from the point of view of technique, has made in a short time exceedingly rapid progress. One has followed with interest the innovations and improvements which have appeared from across the sea, and sometimes the inventor and producer here have anxiously asked themselves whether it was not to be feared that European fields would not be invaded some day by American competition. What is the reason why a country, inhabited by people emigrated from Europe and composed of different nationalities, should perform there, instead of at home, "wonders," according to the language of some? One reason is, first of all, freedom from prejudice and from every retarding condition; the sole thought of monetary gain has guided the inventive spirit of the pioneers made up of the weak and the strong. The stimulant of success has encouraged these people and the fear of being discharged without mercy when they did not give satisfaction—these considerations are important causes for the superior production of the American workman as compared with the European.

### American Molder Superior to the Foreign

The production of the American molder surpasses ours by 25 per cent.; 10 per cent. of this is attributable to a greater effort, while 15 per cent. is due to much better tools and facilities. The owners or directors do not hesitate to introduce new machinery, no matter what may have been the cost of the old equipment. The workmen hesitate no longer to abandon a familiar method of working when it is demonstrated to them that there is a better one. The direct contact between the workmen and the owner or superintendent who appeals to the good will of the workmen to better his product is striking. The workmen's proposals are favorably received, for the industrial American has recognized that he who works at the same task or at the same machine from morning till evening is the better able to suggest improvements or methods of working. The constant incentive to profit from the least economic advantages, and above all the burning thirst for pecuniary gain, contribute to the effort to suppress to the utmost manual labor if replaced by mechanical contrivances. Because of this an improvement has a triple value in America as compared with Europe, as the following example will illustrate:

An inventor invents a new molding machine which does the work of three molders. He sells this machine for 10,000 francs. Let us admit the wages of an American molder to be \$900, or 4500 francs per year, while that of a molder in France is 1800 francs per year. In America the saving would be  $3 \times 4500 = 13,500$  francs; in Europe it would be only  $3 \times 1800 = 5400$  francs. Therefore in America the machine would be paid for in one year, whereas it would take two years in Europe. It is clear therefore that while the owner with us would hesitate to adopt a novelty, the American is tempted by the results of his calculations and decides at once.

The construction of foundry buildings in general is much the same as the European. Aerial transportation has spread rapidly with the introduction of the monorail advantageously adapted to facilitate the work of the molders, so that the handling of sand, etc., by two or three men suffices to supply many molders working in several places. In a similar manner flasks and molds are handled by the employment of compressed air and electricity.

### Melting of the Iron

The melting of the iron is generally done in cupolas, though many foundries have installed nearby reverbera-

tory furnaces, and large castings or special irons, such as malleable iron, are almost always poured from these furnaces. One of the principal reasons for the use of such furnaces is the presence of natural gas, which one can obtain very cheaply, while the price of coal is not high. The charging of a reverberatory furnace is ordinarily accomplished by means of a rolling bridge and one can easily charge scrap iron of large dimensions. The consumption of coal is about 40 per cent., and in foundries where such furnaces are often used they are employed as heaters of boilers.

In addition to these advantages there is the added one of having a large quantity of liquid iron at one's disposal when very large castings are to be poured. Thus at the Mesta foundry, at Homestead, Pa., a casting weighing 120 tons was poured in 17 min. The piece remained in the sand 16 days. The melting of the iron was done in four reverberatory furnaces and 135 tons of sand were used in molding.

The construction of the cupola does not differ much from ours. I observed, however, that the consumption of coke was sensibly higher than is customarily used here and an average of 15 per cent. is normal. Not much attention need be paid to this because the coke is cheap (20 francs per ton delivered), provided one obtains a hot and liquid iron. I noticed in one foundry, where castings of average size were made, a cupola that was abnormal as regards the introduction of the air. At the usual height of the tuyeres small rectangular holes were cut in the periphery of the masonry, and at the center of the cupola, opposite the zone of fusion, there was a mushroom valve of cast iron covered with refractory material for the admission of air. This arrangement, which has not as yet given any conclusive results, will be used to admit only the necessary quantity of oxygen uniformly distributed at the fusion point, which should prevent the formation of too large amounts of carbon monoxide, for as we all know, the best thermal effect of the cupola is secured when the greatest amount of  $\text{CO}_2$  possible is produced. However, I could not assure you that this is the case with the cupola I have just described, for the trials have not been finished.

### Steel in the Cupola

At the request of the Comité de l'Association Technique de Fonderie I was commissioned to study the question of the direct melting of steel in the cupola. According to my information this procedure, of which there have been many trials, has not given any better results in America than in Europe. Besides, to produce a metal having the properties of steel is an impossibility because of the great absorption of carbon, which cannot be prevented in an apparatus like the cupola when the scrap and the coke are intimately mixed.

In a well-equipped steel foundry, at the head of which was a French engineer, I was able to obtain some detailed information on this subject. This steel plant made several melts per month in which nothing but iron and steel scrap were charged. The metal obtained, in spite of the fact that only mild iron scrap was used, contained 1 per cent. of carbon. The quantity of coke used was naturally very high. I was not told exactly, but it was around 25 per cent. In other foundries they melt a mixture of 40 to 50 per cent. scrap, adding a little ferromanganese and the proper amount of silicon. A metal is obtained called semi-steel, which serves to replace special irons having a low carbon content. This metal is used to pour the small pieces which are introduced into bridles, being tougher than ordinary iron.

The use of iron turnings in the natural condition is not extensive, for foundries using briquettes of this material are rare. They use a device that is simple and which avoids the too great fire loss which could result. They

\*In a paper appearing in the August issue of the *Revue de Metallurgie*, M. Brasseur gives his impressions of a rather extensive visit made to this country recently, in which he compares in general American iron and steel foundries with those in Europe. A translation of part of his paper is here printed.

place an iron pipe which has been filled with turnings in the middle of the cupola on the bed of coke. The cupola continues to be filled as ordinarily, and when fusion commences the pipe melts also and descends with the liquid mass. Other pipes are added intermittently and thus the mixture is intimate and the loss at a minimum. Charging of the cupolas is generally accomplished by means of electric or hydraulic hoists. Automatic charging as carried on in nearly all the modern continental foundries is rare.

#### Finishing the Molds

I have said that a large part of the superiority of the American molder was due to better equipment; I mean also to the perfection and the minute detail that is brought to the finishing of the molds. When the molder receives the pattern it is not necessary for him to reflect a long time as to the manner of using it to produce the best mold. His pattern is so constructed that it comes from the sand with the greatest ease, leaving a neatly formed mold. It is adjusted with the greatest precision and the molder endeavors to turn out his work perfect in every respect. The pattern probably costs double ours, but one makes up for it in the ease and rapidity of molding.

When the pattern and core boxes are finished a print in plaster of the different pieces is taken. The cores, also cast in plaster, are placed in their proper places and thus one can control easily the proper thicknesses. After this system of control the patterns are sent to the foundry and the molds can be made and poured without further disturbance.

#### Preparation of the Sand

The preparation of the sand in America is not perfected to the extent that it is in Europe, where the combinations of the many different ingredients have furnished an apparatus almost automatic for the purposes intended. On the contrary, they try there to prepare one mixture suitable for nearly every class of casting. This is especially true in steel foundry molding.

The drying of the molds depends on the location of the foundry. In some cases coal or coke, in others natural gas or oil are used. Many molds are dried by a combination of oil and compressed air playing gently on the mold so as to do no injury. An interesting procedure, used on small or moderate sized molds where deep drying is unnecessary, is carried out as follows: By means of a small watering can light oils are poured on a row of molds and ignited. A very hot flame results which dries the molds very quickly without leaving any harmful deposit. This method of drying is very simple and more economical than placing coke or charcoal stoves in various parts of the larger molds the useful effect of which is very small. I have noticed also that many castings are poured in green molds but their appearance usually suffers.

#### Methods of Molding

We have seen that because of better equipments and facilities for work the American molder does work superior to ours. This is, however, true only in the case of routine work and for castings which do not need special skill. In intricate and complicated work the American molder cannot equal ours. For such work they are obliged to have recourse to molders who have left the trade and whom they have to pay highly. In spite of this they do not turn out the quantity of work that they do here. Each foundry having its specialty is equipped to produce this at a very low cost. Molding in such foundries is easy since, once learned, it is the same thing from year end to year end. Besides these, however, there are numerous foundries producing castings of all kinds.

Since the molder there is paid by the piece and since it is not the custom, as it often is in Europe, to cut the contract price as soon as it is seen that high wages are being made, he exerts himself all the more to augment his income. Another method satisfactory to employer and employee is resorted to to reduce the price. By arrangement with the workman they buy from him at a price agreed upon the increment of perfection and fix a new contract price.

[The author here describes in detail the method of making snap flask molds used in America and eulogizes its simplicity and cites the fact that a large amount of work is turned out by entirely unskilled labor.]

#### Molding Machines

The use of molding machines is growing constantly in the United States contrary to the conditions here. This is especially true in the case of the simple machines. Their use is one of the reasons for the large output of the foundries over there. With us mechanical molding is not considered unless hundreds or thousands of pieces are to be molded, but as soon as the American founder finds that even a small economy is to be derived he adopts the method eagerly. The molding machines most used are the jarring type, little known on the continent, but which you have doubtless seen described in the technical papers. These machines have been perfected by use and their simplicity is extraordinary. There are hand as well as pneumatic and hydraulic designs. The construction of the hand machines is very simple. I have, however, observed that these machines have a splendid output for castings that are not high nor very complicated. In the latter case the machines constructed by European firms and especially by French, have proved their great working adaptability.

Some American plants have perfected the hydraulic jarring machines so that they can meet all exigencies. The construction is low and simple, requiring but little foundation with low cost, at the same time preserving great solidity and being able to mold castings up to 2 sq. m. in size. The ramming of the sand is accomplished uniformly and quickly. The great simplicity of these machines has resulted in their widespread use.

Several foundries which I visited, using European machines, have been obliged to abandon them because the workmen have been unable to familiarize themselves with these more complicated machines demanding for careful work more attention and some reflection—two things which it is unnecessary to expect in American molders who think of nothing but working quickly and making money, to the detriment of careful work and of the finish of the castings as demanded by us.

#### Chipping and Cleaning of the Castings

In America they do not give the finish to the castings which we force ourselves to obtain by fastidious molding and by as perfect a cleaning as possible. The equipment for the latter is by no means as complete as we are accustomed to see it here, especially in the steel foundries. Also the sand blast is not used extensively, and it appears that only recently have the manufacturers endeavored to perfect this apparatus, inspired entirely by the novelties of continental Europe. The removal of heads and gates, etc., is accomplished extensively by means of the oxy-acetylene flame. The pneumatic hammer is also widely used. The cold saw, an efficient but slow tool, is employed only in a few cases. The small castings are cleaned in tumbling machines which are numerous. I was able to count six in one foundry, five of them having a diameter of more than one meter. These machines clean very rapidly, but the appearance and cleanliness of the castings leave much to be desired. It is true that often this is not of much importance, but I am sure that the consumers who are accustomed here to receive castings nearly perfect would not be of the same opinion as the Americans and would refuse their product.

#### General Remarks on Manufacturing

In general the production there is conducted by persons who do not know enough of the theory nor of the metallurgical and chemical principles. They aim to produce a soft metal and they work with great agility and ease for the machines, constructed for speed, could not turn out a maximum amount of work if castings were produced of a toughness or of a hardness above normal. The workman, who has taken piece work at an invariable contract price, is the first one to protest if he is furnished with a metal the least difficult to work.

A few words remain to be said about the making of steel for castings. In 1912 there were 5906 foundries in the United States, distributed as follows: 4475 iron foundries, 299 steel foundries, 175 malleable iron foundries and 1047 copper, aluminum and other foundries. The 299 steel foundries produced in the first six months of the year about 498,000 tons of castings. (France in the same period produced 25,000 tons.) This was produced as follows: In open-hearth furnaces, 456,027 tons; in converters, 30,014 tons; in crucible 8,126 tons; in electric furnaces, 531 tons; other processes, 3163 tons.

It is to be remarked that the crucible furnace is quite extensively employed in spite of the excessive labor and the large amount of fuel necessary, whether it be oil, coke or natural gas. In many of the foundries there one sees crucible furnaces of antique construction. The price of crucible steel castings is sufficiently high, 30 to 40 francs per 100 kg. But since they pour principally automobile work, which is remunerative, they make money. In the United States in many foundries front and rear axles are poured of steel which with us would not be risked, for they would be made of forged steel.

The open-hearth furnace, the largest producer of steel castings, is found in styles as varied as antiquated. In the same foundry one can find a furnace with all modern improvements side by side with an old one. I found, however, many furnaces fired with oil, with burners simply constructed, and able to be so easily regulated that economy in the fuel is notable. It is not only in the United States but also in Russia that these oil-fired furnaces have given the best results in the quality of the steel as well as in fuel economy. We shall see, in a time not far distant, such furnaces used in European countries where tar oil is being introduced as a source of heat in metallurgy. Very conclusive trials have already been made and the latest information I have obtained on this subject is very encouraging.

The small side-blow converters are quite extensively used in America, and without regard to any particular system they work more or less well, results being better in some foundries than others, depending on the methods and the operators. As to the production of steel in the electric furnace, the results obtained in America are not satisfactory. Of about eleven electric furnaces installed three have scarcely succeeded in achieving a reputation or regular operation. It is, however, established that the quality of steel they produce is far superior to other steels. When Americans realize, however, that this steel, though expensive, is better than ordinary steel, they will set themselves to work and achieve results entirely as satisfactory and beneficial as have been obtained in Europe.

#### Conclusions

The conclusions which we should derive from all that I have said are:

It is necessary for us to rid our industry of a ballast which is as trammeling as it is harmful to a progressive development.

If we desire to retain our position in world commerce old methods ought to be abandoned as well as ancient equipment.

Employers and employees ought to work together; they should be ready to adopt new ideas and methods; to accept new machines when proposed in order to secure the best possible results. Otherwise we shall not be able to compete with such countries as the United States, which has embraced new ideas and which, furthermore, is endowed with rich natural resources. We have the elements of success, and it is up to the owners of our factories to decide whether and to what extent they wish to utilize these in the future.

Bliss & Laughlin, Inc., manufacturers of turned shafting and cold-drawn and cold-rolled flats, squares and hexagons, Harvey, Ill., are now occupying their new warehouse, 1023 to 1027 West Jackson boulevard, between Morgan and Aberdeen streets, Chicago. Their facilities have been greatly improved, and their warehouse stocks have been so increased that they are enabled to fill orders without delay.

The Quigley Furnace & Foundry Company, Springfield, Mass., has removed its engineering and sales offices to 105 West Fortieth street, New York City. The company builds powdered coal, gas and oil burning equipment, annealing, heating, forging and melting furnaces, soaking pits, core and mold drying ovens, melting furnaces for open-hearth steel, malleable and gray iron, etc.

The William Cramp & Sons Ship & Engine Building Company, Philadelphia, launched November 8 the torpedo boat destroyer Downes for the United States Navy. The vessel is so far advanced in construction that it will be ready to go into commission in a few months.

### Fighting the Kahn Trademark Act

WASHINGTON, D. C., November 11, 1913.—Members of both House and Senate are being deluged by American manufacturers for an amendment of the Kahn act, and it is probable that this will soon be done. The act, which was passed for the express purpose of encouraging foreign exhibits at the San Francisco Exposition in 1915, contains a clause that thousands of American manufacturers regard as a "joker" of serious proportions, as they claim it would allow a foreign imitator of an American patent to gain exclusive control of the American market for a period of three years by exhibiting one sample of his imitated product at that exposition. The provision which is feared sets forth that it shall be unlawful for any manufacturer in the United States "to copy, imitate, reproduce or republish any pattern, model, design, trademark, or manufactured article protected by the laws of any foreign country by registration, copyright, patent or otherwise, which shall be imported for exhibition at the Panama-Pacific International Exposition and there exhibited."

The fear is expressed that a foreign manufacturer can select some profitable American product, take its trademark, etc., to the patent office of his country, register it as his own, and upon the importation at San Francisco of a single one of the articles in question, and under the Kahn act as read by the protesting manufacturers, the American who has the rightful claim would be liable to fine and imprisonment if he continued to turn out the article.

So strong has been the protest against the bill that efforts will be made to put the amendment through in the opening week of the new Congress which convenes the first Monday in December, in the event that the legislative programme of the majority will not permit of its being considered at the present session.

The bill, in addition to the provision quoted, provides the steps to be taken by a foreign exhibitor to protect so-called "infringements" and these steps are the ones which appear to be the real thing feared.

W. L. C.

### Book Review

**General Metallurgy.** By H. O. Hofman. Pages xiii + 909, 7 x 9½ in. Published by the McGraw-Hill Book Company, New York. Price \$6.

As there was no single work on general metallurgy meeting present-day requirements, the author set out to combine what is still recognized as authoritative in older works with a statement of the results of modern research. The whole has been treated from the viewpoint of the metallurgist who has a leaning toward physical chemistry. Considerable space has been devoted to mechanical processes since the tendency of present metallurgical development is in this direction. Technical literature has been quoted freely and bibliographical references are voluminous.

The book is announced as the first of a series of five volumes, the other four to deal respectively with copper, iron and steel, lead, and the minor metals. In this volume the author, who is professor of metallurgy in the Massachusetts Institute of Technology, covers the physical and chemical properties of metals, alloys, and metallic compounds, the various types of metallurgical processes, their ores, fluxes, apparatus and products, and the various fuels and refractory materials. A long chapter is devoted to pyrometallurgical processes and apparatus. It is difficult to decide just what belongs to a treatise on general metallurgy, and what should be left to separate treatment. Professor Hofman has adopted a broad policy in this respect and has included hydrometallurgical and electrometallurgical processes and apparatus.

The completion of the work reflects a great deal of credit on the author since the amount of labor involved in its preparation shows the patient accumulation and painstaking sifting necessary which have resulted in a logical arrangement. The volume contains 836 engravings and 252 tables.

It is reported from Mt. Vernon, Ohio, that plans are being worked out for the taking over of the property of the Reeves Engineering Company in that place by the Hope Engineering Company, Pittsburgh, Pa.

## Trade Publications

**Springs and Axles.**—Hess Spring & Axle Company, Carthage, Ohio. Catalogue. Shows a number of different types of axles and springs for both wagons and automobiles, and gives considerable useful information on the dimensions and capacities of different kinds of springs.

**Autogenous Welding Machines.**—F. C. Sanford Mfg. Company, Bridgeport, Conn. Catalogue. Shows a number of different types of oxy-acetylene welding machines which are made in both portable and stationary sizes. An interesting feature of the catalogue is the illustration with a brief description of what is said to be the largest weld ever made by the oxy-acetylene process. This was in the bed of a large alligator shear and measured 19 x 21 in.

**Graphite and Graphite Preparations.**—International Graphite Company, Niagara Falls, N. Y. Five pamphlets. Describe various graphite products, such as boiler graphite for the prevention of the formation of scale and Oldad and Gredag which are a preparation of deflocculated graphite ready to be mixed in lubricating oil and a preparation of graphite in grease. The various uses to which these lubricants can be put are briefly touched upon, and the advantages of using all of the graphite preparations are pointed out.

**Internal Combustion Engines.**—Armstrong Mfg. Company, Waterloo, Iowa. Pamphlet. Relates to a line of internal combustion engines, using kerosene and gasoline as fuel, which are made in a number of sizes for both stationary and portable use. A brief description of the special features of the engines, which are built in eight sizes, from 1½ to 20 hp., is given, together with a condensed table of specifications.

**Metal Working Machinery.**—Walcott & Wood Machine Tool Company, Jackson, Mich. Collection of loose leaf circulars. Deal with a line of metal working machinery which includes quick change gear lathes of varying swings, and three sizes of shaping machine which can be supplied with the gear box drive, if desired. Illustrations and condensed specification tables are given on one side of each of the circulars, while a description with halftone engravings of the various parts are found on the reverse sides.

**Power Plant Specialties.**—Griscom-Russell Company, 90 West street, New York City. Folder and collection of bulletins. The former shows the various power plant specialties handled by this firm, while the bulletins contain more detailed information with numerous halftone engravings. The articles covered include steam engines, feed water heaters, condensers, steam and oil separators, water filters and copper expansion joints.

**Gear Hobbing Machines.**—Barber-Colman Company, Rockford, Ill. Circular No. 105. Relates to a machine for generating spur and spiral gears. An illustration of the machine is given, followed by a brief statement of the advantages of the generating or hobbing method of manufacturing gears and the circular concludes with a general description of the machine.

**Road Building and Rock Crushing Machinery.**—Indiana Road Machine Company, Fort Wayne, Ind., Good Roads Machinery Company, Inc., Fort Wayne, Ind., selling agent. Pamphlet. Concerned with several types of road building and rock crushing machines, all of which are illustrated and briefly described. The machines listed include portable and stationary rock crushers, revolving screens, stone bins, elevators, scrapers, road rolling and oiling machines, plows, scrapers, graders, etc.

**Cranes.**—Toledo Bridge & Crane Company, Toledo, Ohio. Circular. Lists the clearances required for different parts of the company's standard cranes, with the view to having the proper clearance provisions made where cranes are to be installed at the time building is erected, thus doing away with the extra cost necessitated by the building of a crane for confined clearance spaces.

**Well Supplies.**—A. D. Cook, Lawrenceburg, Ind. Catalogue No. 11. Covers a line of tube well supplies and steam engine, belt and motor driven deep well pumps. Descriptions of the various machines are given, together with numerous halftone engravings and drawings, giving the dimensions of the various sizes. Instructions for sinking a tube well are given, together with a number of tables of useful information.

**Iron Sheets.**—American Rolling Mill Company, Middletown, Ohio. Pamphlet. Presents a number of illustrations of this product in use for various purposes, such as tank bottoms, window sash, chimneys, pipe, metal siding, etc., together with a number of testimonial letters. Considerable information on the acceleration and prevention of corrosion is given, together with a number of tables of weights of the various sizes.

**Sawmill Machinery.**—Wheland Machine Works, Chattanooga, Tenn.—Catalogue F and several circulars. Call attention to various types of machines for use in sawmills, together with the engines, boilers and transmission appliances required to operate them.

**Mechanical Leather Goods.**—Chicago Rawhide Company, 311 Elston avenue, Chicago, Ill. Illustrates and describes an extensive line of mechanical leather goods, which includes belting, straps, packings, frictions and gears. The steps pursued in the manufacture of these goods are given and there are a number of tables showing the different sizes in which they can be supplied.

**Steam-Hydraulic Elevators and Cranes.**—Craig Ridgway & Son Company, Coatesville, Pa. Catalogue. Treats of numerous devices for elevating material, which are operated by the steam-hydraulic system. This operates by turning steam into a closed cylinder partly filled with water which at once takes the same pressure as the steam and can be used for lifting, pushing, pulling and similar operations.

**Electrical Measuring Instruments.**—Sangamo Electric Company, Springfield, Ill. Bulletin No. 36. Gives general description and specifications for a line of mercury rotation type ampere hour meters for general service. The uses of these meters are pointed out and there are a number of views of the various types of instruments, together with connection diagrams and test curves.

**Sheet and Tin Mill Products.**—Trumbull Steel Company, Warren, Ohio. Catalogue. Describes and illustrates a line of steel and charcoal iron corrugated sheets, roofing, roofing tin, roll and cap roofing, siding, shingles, tile, black and galvanized sheets, tin andterne plate, charcoal bright and coke tins and other formed products. Considerable space is devoted to information of value to sheet metal contractors, such as rules of measurement for roofing, approximate weights and covering capacities of corrugated sheets, the application of corrugated sheets for roofing and siding, the U. S. standard gauge and weights, standard lists of extras, tables for computing length of curved sheets, weights of galvanized sheets per sheet and bundle, etc.

**Motor Trucks.**—International Motor Company, 1770 Broadway, New York City. Brochure. Illustrates the various uses to which these trucks may be put and contains a general mechanical description of the 4½-ton size.

**Air Pump Unions.**—National Tube Company, Frick Building, Pittsburgh, Pa. Circular. Devoted to the Kewanee air pump unions, which are largely used on the air lines of locomotives. The advantages of this union are presented in the form of a supposed dialogue between a salesman and a prospective customer. With a view to preventing failures in service, these unions are tested with compressed air up to 125 lb. under water before leaving the factory.

**Springs.**—Kalamazoo Spring & Axle Company, Kalamazoo, Mich. Pamphlet. Shows a few of the standard types of springs manufactured by this company for automobiles. These styles can be furnished in any required size, and in addition special patterns can be made to order from blueprints. There is practically no text in the pamphlet, which is almost entirely given over to illustrations of different springs.

**Bending Machinery.**—D. A. Hinman & Co., Sandwich, Ill. Pamphlet and circular. The former pertains to a line of hand bending tools for eyes, angles, rings and hinges. All of the different machines are illustrated and briefly described, and there are a number of illustrations of work which it is possible to turn out. The circular is concerned with portable bar and eye bending machines which can be used in the field.

**Gasoline Engines, Shafting Hangers and Couplings.**—Challenge Company, Batavia, Ill. Catalogue No. 61 and circular. The former lists the different types of Challenge gasoline engines which are made in both portable and stationary styles and gives a description of the various features. The folder is concerned with a line of shafting hangers, couplings and shaft collars, for which complete dimensions are given.

**Water Purification.**—Reisert Automatic Water Purifying Company, 30 Church street, New York City. Several pamphlets. Refer to the advantages of using soft water in power plants and show how it may be secured by the use of the company's water softening and filtering apparatus. Views of the different devices are given, with brief descriptions and a number of testimonial letters are included.

**Steam Turbines and Special Machinery.**—Humphrey Machine Company, Keene, N. H. Catalogue and collection of folders. The first deals with a line of hydraulic turbines which are built for a wide range of heads. Tables of dimensions and powers and speeds developed are given. The circulars pertain to the different lines of special machinery which can be supplied.

**Concrete Reinforcing.**—Trussed Concrete Steel Company, Detroit, Mich. Eleventh edition of the Hy-rib handbook. Shows the company's new seven-rib Hy-rib, and includes new tables of carrying capacities and tables for use in walls, ceilings, partitions, etc., the specifications having been completely revised to provide for this new material, which replaces the four-rib product formerly used. A number of interesting applications of this material to all classes of structures are shown. An illustrated description of this new form of reinforcing material appeared in *The Iron Age* September 11, 1913.

**Hollow Safety Set Screws.**—Bristol Company, Waterbury, Conn. Folder. Relates to a hollow safety set screw which can be supplied with five different styles of points. The screw is a hollow shell threaded on the outside and having a number of dovetail sockets on the interior into which corresponding projections on the wrench fit. A description of the screw, together with a list of the fields for which it is adapted, is given.

**Oil Extractors.**—Albert B. Curtis, 25 Union street, Worcester, Mass. Three loose leaf circulars. Treat of a line of oil extractors for freeing the chips from oil. Each of the circulars contains an illustration of one of the machines with a brief description of it.

# The Machinery Markets

That the machinery markets are quiet, with the demand for machine tools especially dull, comprises the salient feature of the situation everywhere. New York has very little before it aside from a list issued by the General Electric Company. Conditions are unchanged in New England, where the machinery and supply business is not good yet not altogether flat. In Philadelphia both inquiries and sales are far below normal and manufacturers do not see much encouragement in the outlook. Smaller purchases by automobile factories are felt by the trade in Milwaukee. Business in Indianapolis has been at a standstill for about eight days because of the street railroad strike. It is now, however, a thing of the past. The Detroit market is dull and not much improvement is expected before January 1. After a short spurt business is dull again in Cleveland, though some of the supply manufacturers are doing a good business. In Cincinnati, October transactions were fewer than those of the same month last year, but a slight improvement is shown in the export trade. Business in machinery has fallen off considerably in Birmingham, although the demand for gasoline engines is active. St. Louis conditions are quiet. Texas activities have been retarded by heavy rains. The money stringency is felt in Seattle and lighter buying has resulted. The prospects for future business on the Pacific coast are considered encouraging, despite the shutting down of lumber mills and mines in consequence of severe weather.

## New York

NEW YORK, November 12, 1913.

About the only encouraging proposition in this territory is a fair sized list put out by the General Electric Company, Schenectady. This company for several months past has contributed abundantly to the support of the market. The trade has also received specifications on an extensive list of machine tools for the ship-building and repair shops of the Grand Trunk Pacific Railway at Prince Rupert, British Columbia. The requests for bids were sent out by William T. Donnelly, consulting engineer, 17 Battery place, New York, but estimates are to be sent to J. H. Guess, purchasing agent of the railroad at Montreal. Most of the machinery required will probably be ordered through Canadian or Western houses. Foundry and boiler-shop equipment is also to be bought.

The quiet of the past few weeks has become more pronounced and there is a growing lack of cheerfulness on the part of sellers of machinery. They are not so much concerned over present conditions, however, as over their inability to see reasons for betterment in the next few weeks. The majority opinion is that the close holding of investment funds is responsible for most of the conservatism now shown, although other influences, such as the tendency to await so far as possible the ultimate effect of the new tariff and the slowing up of industry generally are large factors. So far as the possibility of foreign competition in machinery and accessories is concerned very little has been demonstrated as yet, although a case may be mentioned where an American maker of drill chucks lost business because he could not meet the price of a foreign manufacturer, the rate of duty on chucks having been reduced from 45 to 20 per cent. One evidence of diminished demand is the statement by some firms who had contemplated the buying of additional equipment that they now find some difficulty in keeping what they have going at full capacity. Representatives of the trade have been informed that the expected buying by the General Vehicle Company for its new shop in Long Island City will most likely be deferred, for a short time at least. It was expected that this business would be placed before the end of the year, but action before January 1 is now uncertain.

H. S. Otto, 1876 Broadway, New York City, machinist and gear cutter, is completing plans for leasing or building a factory at Tarrytown, N. Y.

Mann Bros., manufacturers of refrigerators, 250 South street, Brooklyn, are having plans prepared for a factory building, brick construction, to cost about \$50,000, which they will erect at Tarrytown, N. Y.

The Empire Art Metal Company, College Point, Long Island, N. Y., has been incorporated with a capital stock of \$250,000 to manufacture hollow steel doors and interior trim. A one-story plant of frame construction, occupying a square block, is being erected at Eighth and Ninth streets, Second and Third avenues, College Point, which is expected to be in operation within three weeks. John W. Rapp, the president, was formerly president of the United States Metal Products Company, and was the pioneer in that line. A. J. Con-

nell, vice-president, was in charge of the sales department of the same company, and William C. Lange, secretary, was its purchasing agent and cost accountant.

The Standard Brass Works, Hoboken, N. J., has erected a factory and will build further additions in the spring. Edward S. Horan, the proprietor, advises that all purchases for equipment have been made.

The F. H. Johnson Construction Company, Newark, N. Y., has been awarded contracts for the erection of power houses in connection with the Erie Barge Canal work, between Albany and Utica and Syracuse and Tonawanda.

The state hospital commission, Albany, is receiving sealed proposals until November 2 for additional power house equipment: boilers, air compressor and elevators for the Kings Park State Hospital, Kings Park, N. Y.

Plans have been completed for the city of Albany by Stephen B. Vernon, engineer, for a pumping station and sewage disposal work, to be located on Westerlo Island, for use in connection with an intercepting sewer. The total cost of the work is estimated at \$1,000,000.

The John H. Jackson Tile Company, Albany, N. Y., has been incorporated with a capital stock of \$25,000, and will build a plant for the manufacture of tile, brick and other building material. F. C. Yedder, P. Holland, Albany, and F. V. Griessman, Voorheesville, N. Y., are the incorporators.

The Trojan Ice Cream Company, Troy, N. Y., has completed plans for a manufacturing plant at North Troy, 50 x 100 ft., two stories and basement, to cost \$30,000.

The Syracuse Linen Company, Syracuse, has been incorporated to manufacture linen textiles by Michael J. Carroll, George Sherer and Allen R. Cowie.

The New Process Gear Company, Syracuse, N. Y., is erecting a case hardening building, 40 x 60 ft., of brick and steel construction. T. W. Mechem is president.

The Chase Motor Truck Company, Syracuse, will build an addition to its plant for the manufacture of gasoline tractor plows. The estimated cost of the improvement is \$150,000.

The Bartholomay Brewing Company, Rochester, N. Y., is taking bids for a three-story and basement bottling works, brick and steel construction, at its plant at St. Paul and Curtice streets. S. D. Foster is manager.

The Village Board, Ramsey, N. Y., is planning to build a municipal electric light plant.

The Consumers Brewing Company, Oswego, N. Y., will build an engine house, 30 x 40 ft., two stories, with radial stack.

The Aubeuf Company, Oneida, N. Y., has let contracts for the erection of a machine shop, 35 x 65 ft., one story, and a garage.

The Batavia Rubber Company, Batavia, N. Y., has let the contract for the construction of an addition to its plant to cost \$24,500.

Newman Walbridge, Inc., Rochester, N. Y., has been incorporated with a capital stock of \$200,000 to manufacture and deal in hardware and supplies by M. Kimball, F. D. L. Stowe and C. A. Hamlin, Buffalo.

The Lock Insulator Company, Victor, N. Y., has completed plans for an addition, 72 x 150 ft., which it will at once make to its manufacturing plant.

The mill of the Aster Paper Company, Hartlot, N. Y. (near Skaneateles), was totally destroyed by fire November 8, with a loss of \$150,000 on building and machinery. It is expected that the plant will be rebuilt at once. Frank A. Murphy, Auburn, N. Y., is president of the company.

The Pollard Mfg. Company, Niagara Falls, N. Y., has let contracts for the construction of its plant, to be 100 x 110 ft., and to cost \$28,000.

The Board of Aldermen, Buffalo, N. Y., has authorized the committee on lamps and the commissioner of public works to report a general plan for the construction and equipment of a municipal electric light plant, with estimate of cost. Francis G. Ward, Municipal Building, is commissioner of public works.

The Niagara Brass Mfg. Company, Buffalo, has been incorporated with a capital stock of \$30,000 to manufacture brass and metal articles. A plant is being arranged for. A. Spagenthal, A. Stern and M. Grodzinski are the incorporators.

Morrison & Rismen, scrap iron and steel dealers, Buffalo, are building a machine shop, warehouse and office building at their yards, Bailey avenue and the New York Central Railroad, to cost \$15,000.

## New England

BOSTON, MASS., November 11, 1913.

The dullness has not increased. In fact, while business with the machinery and supply people is not good, it is not flat. Individual salesmen have had a very poor time of it of late, but others have been more fortunate. The estimates of the existing situation are based to a large extent upon comparisons with other periods within the year, though this is not so much the case with dealers as with manufacturers. The machine tool builders averaged well in the first six months of the year. Some of them were pushed to their capacities. In a few isolated cases this condition still exists, for exceptional reasons. But the slackening down is, on the whole, quite general. Many of the users of machine tools are, however, busy above the average, and a still greater number are doing a normal business. Few observers expect great activity in the next few months, but many believe that there will be an improvement.

Charles E. Thwing, 134 Gold street, Worcester, Mass., has adopted the name of Worcester Lathe Company for his new business, the manufacture of engine lathes.

The Optical Lens Company, Southbridge, Mass., will erect a new factory consisting of a two-story building, 30 x 80 ft., power house, 24 x 24 ft., and a three-story office building.

The Fallulah Paper Company, Fitchburg, Mass., will erect a mill, 28 x 200 ft., one and two stories, the upper floor to be used for office and laboratory purposes.

The John Dennis Machine Company, Lowell, Mass., suffered a loss of about \$20,000 by fire November 5.

The Wyman & Gordon Company, Worcester, Mass., manufacturer of drop forgings and specialties, is preparing plans for a large office building.

The New Bedford Foundry & Machine Company, New Bedford, Mass., states that it has no plans, as reported, for the construction of a new foundry on land recently acquired in the neighboring town of Fairhaven.

The Cape Ann Tool Company, Pigeon Cove, Mass., manufacturer of drop forgings, states that plans are nearly completed for a building of steel construction to replace the structure recently destroyed by fire. The company expects that its purchases of new equipment will be confined to a steam engine, which has been ordered, practically all the machinery being intact and capable of being put in good condition. A temporary structure has been erected and manufacturing is about to begin again.

The Continuous Zinc Furnace Company, Hartford, Conn., which for some time has been developing an electrical furnace for the smelting of zinc ores, is planning for the construction of a commercial plant in the spring, to be located in Montana or Colorado. The company has recently made a large increase in its capital stock.

The Lovell Engine Company, Hartford, Conn., has been incorporated with a capital stock of \$50,000 by D. M. Wright, of the Henry & Wright Mfg. Company,

760 Windsor street, Frank W. Sickel of the Capital Foundry Company, Hartford, Conn.; A. W. Lovell of Boston, and others, to manufacture a type of automobile engine which Mr. Lovell has been manufacturing in Boston. The company plans to build a factory in Hartford.

William H. Champlin, Dover, N. H., will rebuild on a larger scale his box manufacturing plant recently burned. The structure will be 160 x 200 ft., and will be equipped with modern machinery. Special attention will be given to fire protection, which will include a sprinkler system.

## Philadelphia

PHILADELPHIA, PA., November 10, 1913.

New business continues along narrow lines. It is estimated by some merchants that the volume of new inquiry does not exceed 30 to 35 per cent. of normal, while actual sales, including business which has been under negotiation for some time, averages about 50 per cent. Manufacturers are not particularly encouraged with the outlook. Sales have been confined almost entirely to single tools. Some little business is moving in special machinery. In boilers and engines business continues fair, covering principally equipment for small power plants in general manufacturing lines. Railroad buying of tools and mechanical equipment is again at low water mark. Second-hand machinery continues dull but there has been some movement in power equipment. Gray-iron foundries are fairly active, but steel casting plants are, in instances, not exceeding 50 per cent. of capacity.

The Union Petroleum Company is taking bids on the construction of a new power house, 40 x 68 ft., one and two stories, to be erected at Water and Mifflin streets. The plant of this company was practically destroyed by fire several months ago, but a considerable portion of the power and mechanical equipment was but slightly damaged and will be used in the new power house.

The Philadelphia County Prison, Tenth and Reed streets, will receive bids until November 18 for furnishing for the Holmesburg prison a 35-kw. generator. Frederick A. Cooke is superintendent.

Plans have been completed for a four-story factory building, 50 x 115 ft., to be erected at Howard and Oxford streets, for O'Neil Bros., waste manufacturers. William Steele & Sons are the architects and engineers.

Eavenson & Levering, wool scourers, Camden, N. J., are taking estimates on the erection of a one-story power house, 45 x 60 ft. The building will be of concrete and hollow tile, with metal sash. The boilers have been purchased, but minor equipment is still to be bought.

Simon Weil, 837 North Third street, Philadelphia, has had plans prepared, it is stated, for a one-story garage and repair shop, to be built at Front and Richmond streets.

A permit has been taken for the installation of boilers for G. Lindley at the northwest corner of Second and Norris streets. S. A. Reese is understood to have the contract.

The contract for the erection of a manufacturing plant for the Manufacturers' Real Estate Company, at 203, 205 and 207 North Twenty-second street, Philadelphia, has been let. Information as to the occupants of the building is not available.

Justice Cox, Jr., & Co., Land Title Building, Philadelphia, are in the market for an electric locomotive equipped with two 101-B-2 Westinghouse motors, 500 to 600 volts, direct current, with K 14 controllers or equipment of similar character; also for a caboose car with two 4-wheel trucks, 60,000 lb. capacity, with doors at each end.

It is reported that the United Service Company, Scranton, Pa., expects to instal an additional 500-hp. boiler at its plant at Coshocton, Ohio, one 1500-kw. turbine at its plant at Warren, Pa., and two 250-hp. boilers at its Scranton plant. L. H. Conklin is secretary of the company.

The office building and machine shop of the Breakwater Construction Company, Bellevue, Del., were destroyed by fire on November 4. The loss is estimated at \$5000. The company, which has an office in the Morris Building, Philadelphia, states that the shop and office will be rebuilt and re-equipped, but that no haste will be made in the rebuilding, as the season for outdoor work is about at an end.

## Chicago

CHICAGO, ILL., November 11, 1913.

The general situation with respect to machinery sales has not improved. The Chicago, St. Paul, Minneapolis & Omaha Railroad bought some equipment last week, consisting of a few standard machines. The Rock Island Lines also bought an equally small portion of their recently issued list. The general industrial demand is very scattered, and with competition for the little business offering naturally keen, quotations now being made are particularly close. There is a fair movement of second-hand machinery.

The White Eagle Brewing Company, 3755 South Racine avenue, Chicago, will erect a one and three-story brick addition, 52 x 58 ft., to cost \$40,000.

O. W. Richardson & Co., Chicago, is planning the erection of a \$200,000 six and one-story warehouse, 105 x 260 ft., at 3631 Racine avenue. R. S. Lindstrom is the architect.

The Chicago House Wrecking Company will erect at 1421 West Thirty-fifth street, Chicago, a one-story brick shop, 55 x 120 ft., to cost \$8000.

The Luxmore Differential Company, 38 South Dearborn street, Chicago, has been incorporated with \$7500 capital stock to manufacture and deal in automobile accessories and machinery. Edbert Robertson, Lazarus Krinsky and John L. Anderson are the incorporators.

The Empire Transformer Company, Chicago, has been incorporated with a capital stock of \$10,000 by Irwin J. Mendels, Frank D. Pearne, 2730 Hampden court, and Edward A. Christoph. The new company will manufacture and deal in electrical goods.

The Triple Action Spring Company, East Twenty-eighth street, Chicago, has been incorporated with a capital stock of \$25,000 by Oliver G. Temme, Richard H. Mather and Claude R. Church.

The Automatic Gas Regulator Company, Chicago, recently organized with a capital stock of \$20,000, will manufacture gas and electric appliances. M. Donald Lane, L. A. Landon and J. F. Royer are the incorporators.

The B. Kuppenheimer Company, West Twenty-second street, Chicago, is having plans prepared by S. N. Cowen, architect, for a four-story brick factory, 57 x 260 ft., to cost \$150,000.

John T. Gunningham, Chicago, contemplates the construction of a two-story brick factory, 91 x 125 ft., on West Van Buren street, plans for which are being prepared by T. E. Davidson. The building will cost \$45,000.

The Sun Company, Chicago, has taken out a permit for the erection of a one and two-story brick garage and boiler house on East Halsted street to cost \$20,000.

W. H. Hurst, 6137 Broadway, Chicago, will build a two-story brick factory addition, 50 x 50 ft., to cost about \$4000.

Edwin Johnston, city attorney, Pittsfield, Ill., has been instructed by the City Council to prepare an ordinance providing for a bond issue of \$25,000 for the construction of a waterworks system.

The National Licorice Company is planning to build a \$50,000 branch factory at Moline, Ill., where a site has been purchased.

Miller & Jayne, Monmouth, Ill., have purchased the business and machinery of the Springfield Bridge & Iron Works, Springfield, and improvements are contemplated. Other companies controlled by Miller & Jayne are the Western Boiler Pipe Company, Western Road Tool Company and the Maple City Roller Company.

The Hall Mfg. Company, Monticello, Iowa, manufacturer of agricultural implements, tools, etc., is erecting an addition to double the output of its factory. The addition will be one story and cover 5000 sq. ft. Steel wagon tongues, steel sleigh tongues and buggy poles will be added to the company's line. J. S. Hall is president; M. V. Kehoe secretary, and G. L. Lovell treasurer.

The Briegel & Hagius Mfg. Company, Davenport, Iowa, has been incorporated with a capital stock of \$25,000. The new company will engage in the manufacture of tools and appliances of the smaller kind, instruments and machinery. Theodore Briegel is president and treasurer, and G. Herbert Hagius vice-president and secretary.

The Independent Machine Company, Des Moines, Iowa, has been incorporated with a capital stock of \$15,000. R. C. Stuedman, Andrew Boss and H. H. Derner are the directors.

E. E. Canfield and Fred Scofield, Deer River, Minn., have purchased a site for the erection of a box factory to cost \$30,000.

The Riverside Mfg. Company's plant at Alexandria, Minn., was totally destroyed by fire on November 3 with a loss to buildings and machinery of \$25,000. H. O. Amundson is the proprietor.

The Standard Pencil Company, Hutchison, Kan., will erect a new factory building, 75 x 120 ft., to take care of its increased business.

Bids will be received by D. F. Davis, city clerk, Silver Creek, Neb., until November 24 for a waterworks system.

Bruning, Neb., has voted a \$12,000 issue of bonds for a waterworks system.

Bids will be received by Church Howe, mayor, Auburn, Neb., until November 17 for pumps and electrical equipment.

## Milwaukee

MILWAUKEE, WIS., November 10, 1913.

Business the past week was featureless and the inquiries received were not of a very promising nature. It is evident that some good business in prospect this time has been delayed or postponed until a more propitious period, due largely to the condition of the money market. Complaint over collections is general and only the most secure are being granted necessary loans. Machine tool business, which has been the feature of the situation for a long time, is beginning to feel the effects of conservatism. Automobile factories, which have been heavy buyers, have let up on purchases, immediate needs being satisfied. Farm machinery manufacturers are enjoying good business, and metal specialties producers have no complaints.

The new automobile manufacturing company organized by Captain William Mitchell Lewis at Racine, Wis., has been styled the L. P. C. Motor Company, instead of Lewis Motor Company, the change being made to avoid conflict with the name of the Mitchell-Lewis Motor Company of Racine.

Laird & Cret, architects, Philadelphia, Pa., are completing plans for a new liberal arts building, physics building, engineering shop building and a soil physics building for the University of Wisconsin, Madison, which will cost in the aggregate about \$450,000. A. Peabody, Madison, is supervising architect.

The Feilbach Motor Company, Milwaukee, has increased its capital stock from \$50,000 to \$100,000. The company manufactures motorcycles and a short time ago started construction work on a new plant on the northern city limits, the present quarters at 1146-1152 Holton street being inadequate for its needs. The new stock issue will be devoted to building and equipping the new works, which will make it possible to quadruple the capacity.

The Gas Power Engineering Company, 917 Third street, Milwaukee, has plans for a \$20,000 machine shop and garage building at North avenue and Second street, upon which work will start at once. The building will be 50 x 150 ft. and will contain a complete equipment of power-driven tools with individual electric motors.

Thompson & Harriman, 374 Prospect avenue, Milwaukee, machinists and plumbers, will erect a machine shop, 45 x 120 ft., and costing \$12,500, on Farwell avenue, near Windsor place, Milwaukee.

The Thos. B. Jeffery Company, Kenosha, Wis., automobile manufacturer, has broken ground for a large machine shop addition, to provide approximately two and one-quarter acres of floor space. The structure will be of concrete with sawtooth roof. It is to be ready December 5. The present Jeffery works cover 25 acres, the site of the plant consisting of 105 acres.

The Belle City Malleable Iron Company, Racine, has just been granted final papers on its application to be permitted to increase its capital stock from \$125,000 to \$500,000. Application was made a year ago.

The Gram-Richtsteig Piano Company, Milwaukee, has been incorporated with a capital stock of \$125,000 by Edmund Gram, Max Richtsteig and Otto R. Stiehlm. The corporation will take over the business of the same name conducted as a partnership heretofore. The plant at Eleventh and Winnebago streets, Milwaukee, will be enlarged early next year.

The Milwaukee Macaroni Company, Milwaukee, has started work on a new plant to cost \$400,000, at Jackson and Huron streets. The daily output will be about 75 bbl. A considerable list of special machinery will be required.

The Jesse L. Edgren Company, North Milwaukee, suffered a loss of \$30,000 by the partial destruction of its tin works and kitchen utensil plant by fire. The works, owned by J. J. Schissler of Milwaukee, will be rebuilt at once.

The Racine Motor Oars Company, Racine, Wis., has been organized with \$25,000 capital by Eben Burroughs, F. B. Wingell and Christ Slot, all of Racine, to manufacture automatic devices of several kinds.

The B. Eisendrath Leather Company, Racine, is about to award contracts for the construction of a large addition and for equipment to cost \$75,000 complete.

The Turner Mfg. Company, Port Washington, Wis., formerly the Western Malleable & Grey Iron Company, which is enlarging its business and proposes to engage in the manufacture of small power concrete mixing machinery and feed grinders, has engaged, as chief engineer, designer and experimental manager, Joseph Appleton, for several years designer for the Moline Plow Company, Moline, Ill.

A. C. Velton and son, A. C. Velton, Jr., of Detroit, have leased the former Tomah Mfg. Company plant, Tomah, Wis., and will establish a large machine shop for general work, operating a garage and repair shop in connection. The senior partner was until recently engaged as factory inspector and chief engineer for the Detroit Engine Works, Detroit, Mich. The bulk of the new concern's requirements has been filled, but purchases will be made from time to time.

W. Smiley and son, of Minneapolis, Minn., have purchased the foundry plant at Chippewa Fall, Wis., formerly operated by F. G. & C. A. Stanley, from the Midland Lumber Company, and will begin operations after renovating.

The Lee Handle & Dowel Company, Merrill, Wis., manufacturer of broom handles, has recently erected two additions to its plant and plans to begin work on a small bandsaw mill to replace a circular saw mill. The company advises that it is in the market for sawmill equipment only. The mill will probably be motor driven.

The Advance Car Mover Company, Appleton, Wis., has purchased the business and equipment of the Wagner Car Mover Handle Company, Manawa, Wis., and will consolidate the works at Appleton. Richard Miller is president.

## Indianapolis

INDIANAPOLIS, IND., November 10, 1913.

For eight days, ending last Friday evening, Indianapolis was in the throes of a street railway men's strike that had a paralyzing effect on all kinds of business, the more so because all interurban traffic was stopped at the city limits.

The box factory of the Kottkamp & Schmitt Company, 1424 South Capitol avenue, Indianapolis, was damaged by fire November 3, with a loss estimated at \$9,000.

The Queen Grader & Cleaner Company, Indianapolis, has increased its capital stock \$100,000.

The American Valve Company, Indianapolis, has increased its capital stock from \$10,000 to \$50,000.

The Payne Die Casting Company, Indianapolis, has been incorporated with \$5,000 capital stock, to manufacture dies and die castings. F. E. Payne, M. M. House and J. LeMay are the directors.

The Evansville Steel & Wire Fence Company, Evansville, Ind., which removed from Anderson, Ind., will be in operation by December 1. Its output will be about one mile of fence an hour.

The Globe-Bosse-World Furniture Company, which absorbed the Evansville Furniture Company, Evansville, Ind., has increased its capital stock from \$50,000 to \$150,000. Benjamin Bosse is president of the new company; Charles Frisse, secretary, and Edward Bleecker, treasurer.

Plans have been drawn by Harry Boyle, architect, Evansville, Ind., for a three-story addition to the plant of the Holt & Brandon Ice & Cold Storage Company, at a cost of \$8,000.

The Marion Machine, Foundry & Supply Company, Marion, Ind., has purchased the plant and holdings of the Central Machine & Foundry Company at Virginia avenue and West Fourteenth street, to which the purchaser will move its present foundry. A new cupola will be erected.

Edward Dietrich, Henryville, Ind., will establish an electric light plant, it is reported.

The Singer Mfg. Company, South Bend, Ind., has recently commenced work on a 135 x 165-ft. brick addition, estimated to cost \$50,000.

The Ohio Valley Buggy Mfg. Company, Aurora, Ind., has filed a petition in bankruptcy in the Federal court at Indianapolis. Robert E. Frederick is president of the company. Its troubles were caused largely by losses from the floods in March.

Wilbur F. Pell has been appointed receiver for the

Schoentrup Warden Rack Company, Shelbyville, Ind. The company's plant was twice destroyed by fire this year.

The Northern Indiana Refrigerating Machine Company, Hammond, Ind., has been incorporated with \$15,000 capital stock to manufacture iceless refrigerators by L. V. Cravens, L. M. Heintz and C. Moore.

The Lynn Natural Gas Company, Lynn, Ind., has been incorporated with \$25,000 capital stock to drill oil and gas wells. G. S. Condo, J. R. Browney and E. Davis are the directors.

The Premier Burial Vault & Mold Company, Greenfield, Ind., has been incorporated with \$10,000 capital stock to manufacture burial vaults by J. A. Johnson, H. Smith and C. E. Vaughn.

The Goshen Sash & Door Company, Goshen, Ind., has been incorporated with \$100,000 capital stock to manufacture sashes, doors, etc., by Henry R. Whitmer, M. L. Whitmer and J. M. Farrell.

The Lagrange County Light & Power Company, Lagrange, Ind., has been incorporated with \$75,000 capital stock by George F. Avis, Henry J. Platt and Lyman G. Young.

The National Contracting Company, Evansville, Ind., was the successful bidder on the preliminary work for a Government dam to be constructed across the Ohio River near New Richmond, Ind.

## Detroit

DETROIT, MICH., November 10, 1913.

Business continues quiet and the general machinery demand exhibits no material improvement. Sales are scattering and are of little individual importance. The entire machine tool market appears dull. Inquiry continues light and there appears little likelihood of any betterment until after January 1. The majority of the automobile plants are fairly well engaged and a careful canvass of the plants of automobile accessory and parts manufacturers both in Detroit and in several of the up-state manufacturing centers shows that this industry is on a sound basis and that most plants are busy. Manufacturing machinists report only a fair volume of orders and new business is moderate. The second-hand machinery market is dull. The foundry trade is rather more quiet, but some new business is coming in. Contractors are well engaged but the majority of new projects are of small importance.

The Mercury Cyclecar Company, Detroit, recently organized, has secured a large factory at 807 Scotten avenue preparatory to beginning manufacturing operations. W. J. Marshall is at the head of the company.

The Alleyne Brass Foundry, Detroit, is enlarging its plant by the erection of a one-story brick addition.

The Star Carpet Cleaning Company, Detroit, is having plans prepared for the erection of a large two-story and basement factory building of brick construction, on Mt. Elliott avenue.

The Scripps-Booth Cyclecar Company, Detroit, has been incorporated with \$50,000 capital stock to manufacture cyclecars by William E. Scripps, George G. Booth and Hereward S. Scott.

At a recent meeting of the stockholders of the Packard Motor Car Company, Detroit, an increase in the capital stock from \$10,000,000 to \$16,000,000 was voted. No extensions to the plant are contemplated at present.

The American Cap Screw Company, Detroit, has been incorporated with \$5,000 capital stock by Charles L. Whitman, A. L. Spink and others to manufacture screw machine products.

The Federal Rim Company, Detroit, has been incorporated with \$5,000 capital stock to manufacture automobile wheels by H. W. Bailey, A. H. Goss and W. D. Mercer.

The Conway-McLeod Foundry Company, Detroit, has increased its capital stock from \$15,000 to \$50,000 and changed its name to the Conway-McLeod Company.

The Craig-Millard Company, Detroit, has been incorporated with a capital stock of \$5,000 to manufacture boilers and engines. John W. and C. G. Craig and Martin A. Millard are named as incorporators.

The Tulite Auto Bulb Company, Detroit, has been incorporated with \$25,000 capital stock to manufacture automobile lamps and electrical fixtures by Louis J. Lepper, James M. Richardson and William F. Adams.

The American Motor Truck Company, Detroit, has been incorporated with \$10,000 capital stock to manufacture automobile trucks. Alexander H. Reinhold and William K. Ackerman are the principal stockholders.

The Leggett Engineering Company, Detroit, has been incorporated with a capital stock of \$10,000 by

Ross M. Leggett, Ann Arbor, Mich., and others to manufacture air and water purifying devices.

It is announced that the Fremont Stove Company, Fremont, Ohio, has completed negotiations for the establishment of a plant at Wyandotte, Mich. The company has secured the plant of the Wyandotte Foundry Company, which it will remodel and equip.

The plant of the Youngstown Turpentine Company, Oscoda, Mich., was destroyed by fire November 4 with a loss of \$50,000. It is understood that the plant will be rebuilt.

The J. B. Fogelsong Mfg. Company, Battle Creek, Mich., has been incorporated with \$10,000 capital stock to manufacture building material by J. B. Fogelsong, J. H. and O. J. Murray.

The Vulcanized Products Company, Muskegon, Mich., has begun the erection of a one-story addition to its plant, 100 x 150 ft., to be used as a press room.

It is reported that the Benton Harbor Malleable Company, Benton Harbor, Mich., which recently increased its capital stock from \$80,000 to \$270,000, will purchase some new equipment.

The plant of the Skallas Furniture Company, Niles, Mich., was destroyed by fire November 3 with a loss of \$30,000.

The Kurkham-Mattson Company, Grand Haven, Mich., will remove its factory to Ovid, Mich., where a larger plant has been secured. The company manufactures tables.

The Holbs Concrete Machinery Company is preparing to establish a factory at Adrian, Mich. The company manufactures machines for making cement blocks.

W. J. Pearson, Boyne Falls, Mich., has purchased the electric light plant there and has organized the Boyne Falls Electric Power Company. A number of improvements will be made to the plant.

The Acme Welding & Repair Company, Grand Rapids, Mich., will build a plant at the corner of Ottawa avenue and Trowbridge street, 40 x 80 ft., one story.

## Cleveland

CLEVELAND, OHIO, November 11, 1913.

Business in machine tool lines is again dull after a spurt of activity lasting only a few days. Some scattered buying in small single tools has been reported, but little business is in prospect and dealers do not look for much improvement the remainder of the year. Second-hand machinery is in fair demand. Plant operations in metal working lines are being curtailed somewhat owing to the falling off in orders. No radical reductions in working forces are reported. In spite of the present dullness the feeling is not pessimistic. Some of the larger automobile companies in the Central West making medium-priced cars are operating at good capacity and are buying supplies quite freely. Makers of twist drills report that business is good and that jobbers are ordering good-sized stocks. The jobbing foundry trade is holding up quite well.

The Cleveland Metal Craft Company, maker of metal furniture, filing cabinets and other metal products, will shortly begin the erection of a new plant at East Seventy-first street and the Belt Line Railroad. It will be a one-story building, 60 x 100 ft. Some new machinery will be installed.

The American Ship Building Company will build for its own use during the coming winter two repair boats, each about 100 ft. long. The vessels will be equipped with electric and acetylene welding apparatus, air compressors, lathes and other machinery necessary in repairing damage to vessels above the water line. One of the boats will be built in Cleveland and the other in South Chicago.

The Tanner-Hower Mfg. Company, Akron, Ohio, has been incorporated with a capital stock of \$50,000 by M. Otis Hower, Perry E. Tanner and others. The company is located in the Hower Building. Its products will include brass cylinders, gauges and various automobile parts.

The James & M. M. Maher Chain, Tongs & Wrench Mfg. Company, East Liverpool, Ohio, has been incorporated with a capital stock of \$25,000 by James Maher and others.

The Sterling Specialty Company, Newcomerstown, Ohio, incorporated with a capital stock of \$40,000, is equipping a new brass foundry.

The board of County Commissioners of Allen County, Ohio, will receive bids until December 8 for the installation of an electric generating plant at the County Infirmary. The installation will include a motor, generator and storage battery with accessories. Among the accessories will be a two-hp. and a one-hp. motor.

The France Company, Van Wert, Ohio, will shortly begin the erection of a large stone crushing, handling and storage plant.

It is reported that the Big Four Railroad will equip a plant in Bellefontaine, Ohio, for the repair of steel cars. The company plans to use for that purpose buildings occupied by its engine repair shops, which have been moved to Beach Grove, Indianapolis.

## Cincinnati

CINCINNATI, OHIO, November 10, 1913.

A slight improvement in the export trade is reported by several local companies. Domestic business is probably slower than it was a week ago, and the month of October just passed does not compare favorably with the corresponding month of last year. Electrical equipment is in better demand. A number of large units have been bought in the South recently, some of which outfits were second-hand rebuilt machines. The boiler and tank business is slow. Local foundries are not operating to capacity, and several of them have greatly reduced their working forces.

The Ohio Knife Company, Cincinnati, expects to move into its new plant in Cumminsville December 15. Nearly all the necessary equipment has been purchased.

The Board of Hospital Commissioners, Cincinnati, will open bids December 9 for the power, lighting and heating equipment for the proposed Tuberculosis Hospital, to be erected in Lick Run. Walter G. Franz, consulting engineer, Union Trust Building, Cincinnati, has the plans on file.

On November 8 fire destroyed the garage and repair shop of the Covington Automobile Company, Covington, Ky., with a loss of \$25,000, partly covered by insurance. It is reported that the company will rebuild at an early date.

The Banner Aluminum & Mfg. Company, Wadsworth, Ohio, has been incorporated with \$10,000 capital stock, to manufacture aluminum ware. Harvey J. Heller is one of the principal incorporators.

A small electric lighting plant will be built by the Swanton Light & Power Company, Swanton, Ohio, recently incorporated with \$10,000 capital stock. Abner D. Baker and F. E. Pilliod are named among the incorporators.

The Willour Mfg. Company, Ashland, Ohio, has been incorporated with \$30,000 capital stock, to manufacture plumbers' supplies. LeRoy Willour is the principal incorporator. Nothing has been given out as to equipment requirements.

Julius Boessel, New Bremen, Ohio, is interested in a new company, now in process of formation, to build a large furniture factory at that point.

The Dayton Power & Light Company, Dayton, Ohio, has plans under way for purchasing the plant of the Wilmington Water & Light Company, Wilmington, Ohio. If the plant is taken over it will be enlarged.

The municipality of Grand View Heights, Ohio, has voted a \$50,000 bond issue for building a new water-works plant.

The Egry Register Company, Dayton, Ohio, plans to further enlarge its plant at an early date. A large addition was recently completed and the necessary equipment is now installed.

The Meade Paper & Pulp Company, Chillicothe, Ohio, announces that it will soon have plans ready for an addition to its plant that will cost about \$450,000. No machinery equipment details are yet available.

The Batavia Ice Company, Batavia, Ohio, has been incorporated with \$16,000 capital stock to erect an ice plant. Charles Carver and Harry S. Cole are among the incorporators.

The Roberts Gas or Gasoline Engine & Car Company, Morgantown, W. Va., has been incorporated with \$150,000 capital stock by J. M. Roberts of Pittsburgh; Leopold Sigwart, Frank Sigwart, Morgantown, W. Va.; H. P. Keenan of Fairmont, W. Va., and Eugene Sommerville, Grafton, W. Va.

The Forest Chair Company, Huntington, W. Va., has been incorporated with a capital stock of \$75,000 to manufacture chairs and other wood ware by C. W. Foster, R. L. Archer, J. L. Caldwell, F. D. Fuller, Thomas A. Wiatt of Huntington, W. Va.

The Webster Woolen Mills Company, whose plant at Grafton, W. Va., was recently destroyed by fire, will reorganize and increase its capital to \$50,000 and rebuild with four times the capacity of the old plant.

The Tucker Timber Company, Elkins, W. Va., has been incorporated with \$50,000 capital stock by J. S. Posten, J. T. Davis, W. C. Posten, R. B. Isner and T. B. Cross, Elkins, W. Va.

## The Central South

LOUISVILLE, KY., November 10, 1913.

The volume of business being done by most of the machinery manufacturers is up to the average. In the boiler trade a good deal of business is being closed, but it is said that many of the prices which are being made carry but a small margin of profit, resulting in unsatisfactory business for the manufacturers. The boiler men also state that most of their business is with companies which are either enlarging their power plants or replacing old equipment, and that comparatively few orders indicate installations for new industries. The demand for other classes of equipment is fair. Machine tools are still moving reasonably well. Pump men report trade slow. Woodworking equipment is one of the best lines, though business with the lumbermen is hardly up to expectations.

Much interest is being taken in Louisville in the bankruptcy case of the American Hame & Mfg. Company, New Albany, Ind., which filed a voluntary petition in the Federal court at Indianapolis recently. The company has \$200,000 assets and \$170,000 liabilities, according to the petition. George H. Hester, New Albany, is receiver. A. T. Holzbog, vice-president and general manager, will continue in charge of the plant, which is to be kept in operation, it is said.

The C. Von Allmen Preserving Company, 103 West Walnut street, Louisville, has been organized for the manufacture of jellies and preserves, and will erect a factory early in 1914. Boilers and special equipment will be needed. C. Von Allmen is vice-president and general manager.

The board of public safety, Louisville, is considering installing an electric-light plant at the city workhouse. Rush C. Watkins is chairman of the board.

The Wadsworth Stone & Paving Company, Bowling Green, Ky., is to install a traveling crane for handling asphalt and stone. The cost of the equipment will be \$10,000.

Harrodsburg, Ky., has voted a \$12,000 bond issue for the improvement of the electric light plant.

The Jackson Coal Company, Ft. Branch, Ind., has purchased the Thomas coal mines at Morganfield, Ky. The capacity of the mines is to be enlarged and additional machinery installed.

The Kentucky Utilities Company, Lexington, Ky., has purchased a steam power plant at Varilla, Ky., from T. J. Asher, and will use it as a central distributing station for the service of coal mines. The capacity of the plant will have to be enlarged.

The Warren Milling Company and the Warren Light & Power Company, Sebree, Ky., have been organized by G. H., B. O. and Coleman Warren, who plan to operate a central station in connection with their flour mill.

Charles H. Brady & Co., Owensboro, Ky., will file articles of incorporation shortly with \$100,000 capital stock. The company will build and operate an abattoir and cold storage plant. A site for the plant has been secured and work will begin in the immediate future. Charles H. Brady should be addressed.

The Evansville Coffin Mfg. Company, Evansville, Ind., is planning to establish a branch factory at Maysville, Ky., it is reported. W. S. Mooney has represented the company in negotiations looking to the establishment of the plant.

Henry Cooper and Frank Wiseman, who have purchased the flour mill of M. A. Cooper at Cecilia, Ky., have decided to add a large grain elevator and will be on the market for the equipment in the near future.

Ben W. Robinson, Earlington, Ky., has become president and general manager of a new coal mine at Equality, Ill., and will be in the market for power and mining machinery in the immediate future.

The Eureka Resilient Wheel Company, Ludlow, Ky., has been incorporated with \$10,000 capital stock, to manufacture a patented automobile wheel. It is understood a factory building has been secured and that operations will commence at an early date. G. A. Simpson, Ludlow, and Charles Schroeder, Cincinnati, are among the principal incorporators.

The Warren Light & Power Company, Sebree, Ky., has been incorporated by G. H., B. O. and Coleman Warren, and will equip a public service plant at Sebree.

The Tennessee Mill Company, Estill, Tenn., is reported in the market for the purchase of rock crushing equipment.

Thomas Carter, Sam Brown and others are planning the establishment of a flour mill at Ooltewah, Tenn.

The Knoxville Iron Company, Knoxville, Tenn., whose machine shop was recently burned, has decided to rebuild, and will be in the market for a 4-ft. radial

drill. The remainder of the machinery will not have to be replaced.

The Concord Lime Works, Concord, Tenn., will rebuild its plant, which was recently burned. Two mill buildings will be erected. Ben Jones is head of the company.

Ferguson & Briscoe, Bristol, Tenn., will be in the market for machine tools for the repair shop of an automobile garage which they are establishing.

The city of Dickson, Tenn., has decided to spend several thousand dollars in the improvement of its water system. Address the mayor.

The Eli D. Miller Mfg. Company, Evansville, Ind., has leased a furniture plant at Knoxville, Tenn., and will begin operations at once. A large amount of new machinery will be installed and the capacity of the factory increased. George L. Miller is to be superintendent of the plant.

## Birmingham

BIRMINGHAM, ALA., November 8, 1913.

Machinery dealers report that business has fallen off considerably, owing to the dullness prevailing in the iron and steel trades and in lumbering and coal mining. Practically no demand is in evidence for machine tools. Hardware and agricultural implements hold their own, owing to the high prices for cotton. Gasoline engines for farms, mills and factories are active. The demand from lumber mills is least of all. Lumber is off in price and mill operations are on short turn.

The McDonough Ore Mining Company, Birmingham, which recently increased its capital stock, will establish at Gate City, near Birmingham, a \$30,000 plant for manufacturing lime flour, concrete, building and fluxing stone. R. N. McDonough is president. J. J. Shannon, J. H. McDonough, J. T. Robinson and others are interested.

The Sample-Williams Mfg. Company, Jackson, Ala., will establish a plant for manufacturing dry colors for paints, linoleum, etc., at Mobile, Ala. The raw material is to be ochre mined on a 60-acre tract.

It is reported that the Coosa Pipe & Foundry Company is to change its pipe factory power from steam to electricity.

J. A. Bass, Bainbridge, Ga., contemplates erecting a cotton gin of large capacity and a fireproof warehouse.

The Haney Fire Apparatus Company, Tampa, Fla., will install a foundry pattern shop and machine shop to manufacture outside fire elevators, auto trucks and auto pumps.

## St. Louis

ST. LOUIS, MO., November 10, 1913.

Trade in the machine tool market is at low ebb, comparatively speaking. Orders are pretty well scattered and also of the individual character, no large lists having been put out in recent weeks. There is some demand for second-hand tools, but not large in the aggregate. Collections are reported good.

The Stanard Tilton Milling Company, St. Louis, has completed its plans for its new plant at Dallas, Texas, which will have a capacity of 2000 bbl. of flour and 600 bbl. of corn meal per day. A 14-tank elevator will have a capacity of 350,000 bu. The power will be developed by two Diesel engines aggregating 500 hp., which will be constructed at the new St. Louis plant of the Busch-Sulzer Bros.-Diesel Company.

The St. Louis Well Machine & Tool Company, St. Louis, will erect a machine and blacksmith shop to cost about \$12,000, including equipment.

The Dielectric Mfg. Company, St. Louis, has bought a site and will erect and equip an addition to its plant for the manufacture of insulating materials.

The Schnelle Lumber Company, St. Louis, has been incorporated with a capital stock of \$35,000 by August H. Schnelle, A. E. Schnelle and James E. Bennett to manufacture lumber and building materials.

The Woermann Construction Company, St. Louis, has been incorporated with a capital stock of \$10,000 by John W. and Harry A. Woermann to do a general contracting business.

The Morse Land & Timber Co., St. Louis, has been incorporated with a capital stock of \$25,000 by Edward A. Morse, Sr. and Jr., and George T. Riddle, to do a lumber manufacturing business and to develop 6000 acres of timber land in Arkansas.

The United States Double-tree Company, Rolla, Mo., has been incorporated with a capital stock of \$15,000

S. DIESCHER & SONS,

Mechanical and Civil Engineers,

PITTSBURGH, PA.

by F. W. Webb, E. W. Walker and H. W. Lennox, and will equip a manufacturing plant.

The Lewistown Mill & Electric Light Company, Lewistown, Mo., has plans for the addition of a 100 to 200-hp. oil or gas engine to its plant. J. S. Heavenridge is manager.

An electric light and power plant, including a 100-kva., 60-cycle, 2200-volt alternator and a 150-hp. engine, is planned for Canton, Mo., by the city authorities under the supervision of W. Dusenderry, manager.

The California Electric Light & Power Company, California, Mo., has plans for the installation of a 150-hp. boiler, 125-hp. engine and 100-kw. generator. F. T. Porter is manager.

Chaney & Galloway, Cassville, Mo., have begun the construction of a building for the installation of an ice plant with an initial capacity of five tons per day.

The American Dilator Company, Kansas City, Mo., has been incorporated with a capital stock of \$125,000 by Henry Hackbarth, Ross A. Dossman and Margaret Oberweather, and plans to equip a factory.

The Southwestern Gas, Light & Traction Company, Texarkana, Ark., will start work immediately on the construction of a large machine shop in which the company's old cars will be repaired and new ones constructed.

The Lonoke Rice Milling Company, Lonoke, Ark., has increased its capital stock from \$50,000 to \$75,000, and has plans for enlarging its plant.

The plant of the Arkansas Cotton Oil Company, Pine Bluff, Ark., recently damaged \$10,000, will be re-equipped so far as made necessary by the damage.

The Fairland Light & Power Company, Fairland, Okla., of which L. H. Long is manager, has plans for the installation of a generator and storage batteries, as auxiliaries.

A car shop will be built at Sand Springs, Okla., by the German-American Car Company, Harris Trust Building, Chicago, Ill., it is announced. A site has been obtained, but plans as to buildings and machinery are incomplete.

The Chelsea Natural Gas Company, Oklahoma City and Chelsea, Okla., recently incorporated with \$20,000 capital, is in the market for machinery and for gas meters. James Bottomley is manager.

The Pawnee-Osage Oil & Gas Company, Osage, Okla., with capital stock of \$15,000, is reported in the market for equipment. G. O. Smith and R. E. Burks are the engineers in charge.

The Muskogee Wagon Wood Company, Muskogee, Okla., has been incorporated with a capital stock of \$50,000 by J. F. Owens, of Muskogee; G. D. Clepper, of Wagoner, Okla., and F. D. Field, of Omaha, Neb., and will equip a plant for the manufacture of material for wagon use.

The Anderson Mfg. Company, East Tulsa, Okla., has purchased a site for the erection of a factory building to house its plant and machinery to be removed from Coffeyville, Kansas.

The Booneville Water Company, Booneville, Miss., is installing equipment for the operation of a street lighting system. A 60-kw. generator will be purchased.

The Southern Paper Company, of Laine, Miss., has about completed plans for the equipment of an auxiliary plant for the manufacture of various by-products from pine wood, including wood alcohol, pine tar, turpentine, resin, tar oil, acetic acid, etc. Joseph H. Wallace, New York City, is engineer.

Hall Bros., Naples, La., will establish a sawmill at Jonesboro, La. The capacity of the plant will be 25,000 ft. of hardwood lumber.

The L. N. Dantzler Lumber Company, Moss Point, Miss., has bought the State university's timber rights in three counties and will equip mills to develop them.

The Morganfork Lumber Company, Sontag, Miss., has been incorporated with a capital stock of \$15,000 by S. F. Moreton, W. B. Covington and M. J. Hale, and will equip a mill of 30,000-ft. daily capacity.

The Jordan River Lumber Company's plant at Kiln, Miss., is reported destroyed by fire with a loss of \$100,000. It is stated that the plant will be replaced.

The Great Southern Lumber Company, Bogalusa, La., is completing plans for increasing its daily capacity from 700,000 to 1,000,000 ft. It will require a twin band mill, a 46-in. gang saw, 8-in. horizontal resaw, double edger, 24-in. automatic trimmer, 2 locomotives and a 2000-kw. low-pressure turbine. The enlargement is planned to be completed by June.

The New Orleans Brick & Stone Company, Gretna, La., has been incorporated with a capital stock of \$160,000 by Leo A. Marrerro, Charles E. Wermuth, John Lorenz and Lionel M. Ricau, and plans to equip a plant at once, the site having been bought.

The W. G. Ragley Lumber Company, Fulton, La.,

will build and equip a mill with band and gang saws with a daily capacity of 100,000 ft. A similar plant will be built at Carmona, Tex. Plans are being prepared by the McDonough Mfg. Company, Eau Claire, Wis.

The Davis Bros. Lumber Company, Ansley, La., will equip a sawmill to manufacture hardwood from stumpage.

The Calcasieu Naval Stores Company's plant at Kinder, La., is reported burned with a loss of \$16,000. It is stated that it will be replaced.

## Texas

AUSTIN, TEXAS, November 8, 1913.

Heavy general rains have given an unfavorable outlook for the machinery and tool trade. Weather conditions have prevented cotton from being picked and brought to market, and as a consequence the usual fall business activity is not evident. A decided improvement is looked for before the end of the month, however. It is assured that the cotton crop will be short this year, but the growers are depending on high prices to offset any losses.

Work will be started at once on improving the waterworks plant at Hillsboro.

The Farmers' Oil Mill Company, Winnsboro, is constructing a \$50,000 oil mill.

The Texas & Pacific Railroad has let the contract for the rebuilding of its 20-stall round house at Marshall, which was recently burned.

The Hebronville Gin Company, Hebronville, has been incorporated with a capital stock of \$8,000 and plans to erect a cotton gin. H. E. Yaeger, Ascension Martinez and C. W. Hellen of Hebronville are the incorporators.

The Freeport Sulphur Company plans to expend \$150,000 in enlarging its sulphur mining plant near Freeport. The company is backed by S. M. Swenson & Sons, New York.

The Enterprise Iron & Foundry Company, Fort Worth, has been incorporated with a capital stock of \$15,000 by W. H. Horrell, J. A. Horrell and J. A. Horrell, Jr.

The Robstown Light Company, Robstown, has been incorporated with a capital stock of \$25,000 to erect an electric light plant by R. R. McNeil, H. R. Sutherland and H. E. Pope, of Robstown.

The cotton gin of C. E. Ingle, Maypearl, was destroyed by fire last week. It will be rebuilt.

The cotton gin of the Floresville Oil & Mfg. Company, recently destroyed by fire, will be rebuilt. S. V. Houston of Floresville, is the largest stockholder.

The Paris Water Company, Paris, plans an expenditure of \$200,000 on improvements, which will include equipment for a pumping plant to cost \$150,000 and the erection of a large concrete dam.

The Cudahy Packing Company, Chicago, is contemplating the erection of a large packing plant in Fort Worth and has several sites under consideration.

## The Pacific Coast

SAN FRANCISCO, November 6, 1913.

Business in machine tools, and in fact in most lines of machinery, has been very quiet the last month. A number of country buyers have given orders for small shop equipment, but nothing of special interest has been closed, and the number of inquiries has been disappointing. A more cheerful feeling is expressed, however, as November opened with a heavy and well distributed rain. The long drouth is held largely responsible for the lack of activity this fall, and it is believed that the smaller country shops will buy more freely from now on. Improved crop prospects should favorably affect the implement trade. No immediate increase of demand from the larger shops is expected. Woodworking machinery receives little attention, with little prospect of improvement before spring. Sales of mining machinery have held up fairly well, and some quarry and crushing equipment has been sold, but little new inquiry in this line is noted. There is a fair demand for marine engines, but additions to the coastwise lumber fleet are about complete. Recent railroad purchases have been light, but plans are announced for extensive improvements to handle the traffic of 1915.

The Monarch Iron Works, San Francisco, has been incorporated with a capital stock of \$20,000 by N. H. Wood, H. M. Alling and H. Hallensleben.

The Yuba Machine Shops, Marysville, Cal., has

been incorporated with a capital stock of \$10,000 by C. H. Powell, H. C. and M. G. DeWitt.

The town of Burlingame, Cal., is taking bids on a waterworks pumping outfit.

Bids are being taken at Mare Island for hulls and engines for auxiliary vessels for the marine corps.

S. Kulchar, Oakland, manufacturer of store fixtures, is preparing to build a new plant.

It is reported that the Union Ice Company will put in a new plant of 50 tons capacity in Oakland.

The new manual training school at Oakland is about completed, but most of the machinery required was provided for some time ago.

Efforts are being made at San Diego, Cal., to finance a plant for the manufacture of a new type of turbine engine.

P. W. Bagley, Alameda, Cal., is erecting a new boat shop.

Montague, Cal., has voted a \$25,000 issue of bonds for installing waterworks.

Bids will be received by H. E. Cree, city clerk, Riverside, Cal., on November 20, for improvements to the waterworks system.

Several machines are being purchased for the Fresno High School.

The Peoples Ice & Cold Storage Company is preparing to build a new plant at Long Beach, Cal.

It is reported that W. C. Hendrie of the Hendrie Rubber Company, Los Angeles, has placed orders in the East for a large lot of machinery for a new plant at Torrance.

The Southern California Edison Company is preparing to build a large power station at Slide Lake in Santa Ana canyon.

The Las Vegas Roller Mills, Las Vegas, N. M., has announced the intention to install new flour milling machinery.

M. Z. Bates is planning to build a cotton ginning plant at Yuma, Ariz.

Douglas County, Nev., is taking bids on a rock-crushing outfit of about 15 tons per hr. capacity.

A 400-hp. hydroelectric plant is being built on Lamoille Creek, near Elko, Nev.

## The Pacific Northwest

SEATTLE, WASH., November 4, 1913.

Owing to the depressed conditions in the lumber industry, approaching winter, and the stringency in the money market, local machinery dealers report business light. However, they aver that by the opening of the new year the trade will be back to normal, and will continue increasing until a new record in the machinery business in the Northwest has been set. Many mill men who contemplated building new plants or enlarging their present holdings, have been unable to do so on account of the difficulty in borrowing money. "Wait until the first of the year," say the bankers; and expansion is dropped for the time being. A majority of the mills in western, north central and northern Washington are now closed down and will probably remain so until conditions assume a brighter aspect. Due to winter, the majority of the mines will close down, or have done so. Deep snows and cold weather in the interior necessitate discontinuing operations until spring. The mines of eastern Washington, operated to capacity, have had one of the best seasons for many years. Business in the eastern portion of the State of Washington this summer and fall has been excellent. A heavy crop of grain in the Palouse country, the Inland Empire, and a heavier crop of potatoes, hay, fruit, etc., made glad the hearts of the implement and machinery dealers in that section.

The City Council, Seattle, Wash., contemplates appropriating \$200,000 for the construction of a 5000-kw. municipal auxiliary steam plant to be used in connection with the municipal power plant in operation. The proposition is favored by the majority.

The American Bridge Company, New York, was low bidder at \$149,640 for the structural steel to be used in the construction of a combination building for ship-building shop, mold loft, and steel storage shed, to be built at the Puget Sound Navy Yard, Bremerton, Wash.

J. J. Henry, E. C. Johnson and A. Welch recently incorporated the McKay Coal Company, Seattle, with a capital stock of \$1,500,000.

R. B. McAdams, Robert McMirchey and others have incorporated the Tolt Light & Power Company, Tolt, Wash., with a capital stock of \$70,000.

The Spokane Western Power & Traction Company, Spokane, Wash., is planning developing 8000-hp.

to be used to operate factories which are to be established on a site near Spokane.

The Self Oiling Wheel & Bearing Company, Walla Walla, Wash., announces that it will build a manufacturing plant, and that work of construction will begin about January 1. Rhys Davis is secretary.

The Copalis Lumber Company, Copalis, Wash., will build a sawmill to cost between \$75,000 and \$80,000.

The Budd & Ricker Company, Chelan, Wash., will begin work shortly in constructing a marble works, including polishing plant, power plant, etc.

The Canadian Pacific Steamship Company, with head offices at Vancouver, B. C., recently announced that the steamship Princess Mary will be lengthened and equipped with oil burners.

The city of Umatilla, Ore., recently commissioned Louis C. Kelsey, engineer, Selling Building, Portland, to prepare plans for a pumping plant and distributing system for waterworks.

The Astoria Flour Mills Company, Astoria, Ore., has had plans prepared for a mill with a daily capacity of 300 bbls., which will be built in the early future. The company will also build a 100,000 bu. grain elevator.

A group of Canadian capitalists, headed by R. J. Henderson, of Fort Williams, B. C., will build a large terminal grain elevator at Port Coquitlam, B. C. The company is capitalized at \$1,250,000.

The John Orchards Mining, Mfg. & Investment Company will build a \$200,000 pulp plant at Shrimp Bay, Ketchikan, Alaska. The plant will have a 50-ton daily capacity.

## Eastern Canada

TORONTO, ONT., November 8, 1913.

The Canadian General Electric Company, Toronto, is making extensive improvements to the Stratford Mills Building at Stratford, Ont., which was acquired some time ago. A large addition to the foundry is now under way.

Midland, Ont., passed a by-law to loan \$60,000 for the construction of a malleable iron plant to be established there.

The Forest Basket Factory, Forest, Ont., will double the capacity of its plant.

A by-law to guarantee the bonds of the Kingston Iron & Tube Company, Kingston, Ont., to the extent of \$75,000, was passed by the ratepayers. The company will erect a plant near the Grand Trunk Railroad junction on Montreal street.

Foundations have been laid for an addition to the plant of the Canadian Bridge Company, Ford, Ont., to cost \$50,000, exclusive of the machinery.

The Avon Hosiery, Ltd., Stratford, Ont., will more than treble the size of its plant. W. J. Pearson is manager.

The Brantford Ice Company, Brantford, Ont., will erect an ice manufacturing plant to cost \$45,000.

The Stratford Mfg. Company, Stratford, Ont., will practically double the size of its plant in the near future.

The Hydro-Electric Commission has decided to double the capacity of the plant at Falls View, Ont., at once.

J. R. Booth, Ottawa, Ont., will erect a lumber mill to cost \$100,000.

Specialties, Ltd., is building a \$200,000 factory at Montreal.

Evans Brothers, Ingersoll, Ont., will erect an addition to their piano factory to cost \$25,000.

James Cowan & Co., London, Ont., will build a factory to cost \$15,000.

V. Boydell & Co., Manchester, England, will build a factory in Montreal.

John Dawson, Niagara Falls, Ont., will erect a brick plant to cost \$50,000.

The Ford Automobile Company, Detroit, Mich., will erect a four-story factory in Montreal.

La Cie des Chargeurs Beaudry, Ltd., Courcelles, Que., has been incorporated with a capital stock of \$49,000 by V. D. Gonthier, J. E. Belanger and others to manufacture wood and metal.

The Northern Building Material & Iron Company, Ltd., Sault Ste. Marie, Ont., has been incorporated with a capital stock of \$50,000 by John Matheson, A. A. Stoness and others to manufacture building material and to operate a foundry and machine shop.

The Forest City Steel & Iron Company, Cleveland, Ohio, has received the contract for the steel work for the new factory building, 180 x 280 ft., to be erected by the Perfection Stove Company at Sarnia, Ont.

J. N. Doods, Toronto, Ont., is having plans prepared by J. Francis Brown, architect, for a knitting mill to cost \$35,000.

A bond issue of \$116,000 has been voted by St. Catharines, Ont., for the construction and equipment of a sub-power station and a distributing system.

H. J. Craig, Midland, Ont., has organized a company which is planning to build a malleable iron foundry estimated to cost \$100,000.

The Parry Sound Basket & Veneer Company, Ltd., Stony Creek, Ont., recently reported incorporated, will erect a factory for the manufacture of boxes, crates, etc.

## Western Canada

WINNIPEG, MAN., November 7, 1913.

The actual business being done by machinery houses is comparatively light, though considerable trade in small lots is reported. Large contracts are fewer than at the corresponding time last year. The outlook remains encouraging, and there is a fairly active inquiry regarding projects under contemplation. It is confidently expected that the retrenchment of this year will have a beneficial effect on industrial expansion next year. The financial situation is slowly clearing up, although no material improvement is likely until after the first of the year.

The Winnipeg Ceiling & Roofing Company, Ltd., Winnipeg, has secured the controlling interest in the Edmonton Metal Works, Ltd., Edmonton, Alberta, and will enlarge the plant and put in new machines for corrugating iron and other manufacturing work. W. J. Martin, Winnipeg, is president.

The Austin Paper Mfg. Company, Ltd., will build a paper mill at Winnipeg, Man.

The Canadian Brick & Coal Producers, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$250,000 by A. Farquhar, L. Swason and others.

The Canon Lake Lumber Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$100,000 by R. P. Elliott, W. L. McIntosh and others.

The Eastern Terminal Elevator Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$250,000 by J. A. Richardson, A. C. Rutan and others.

A number of contracting companies have submitted plans and specifications to the Canadian department of trade and commerce for the government elevator to be erected at Port Nelson, Man., on Hudson's Bay. It is expected that bids for the plant will be called for at once.

The Canada Cement Company is building a \$2,500,000 cement plant at Dauntless, a few miles south of Medicine Hat, Alberta.

The Alberta Rolling Mills Company, Ltd., Medicine Hat, Alberta, is starting the building of a bolt and nut factory there, under the name of the Medicine Hat Steel Company, Ltd. It is said that the firm will erect a steel mill next year, the equipment of which will cost \$100,000. John L. Pollock is manager.

A project is under way to establish a new furniture factory in Saskatoon, Sask. Frank Giddings is interested.

The Norris Burnett Company, Petoskey, Mich., will locate a machine shop, 40 x 50 ft., in Regina, Sask., for the manufacture of steel tools and other products.

## Government Purchases

WASHINGTON, D. C., October 6, 1913.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, under Schedule 5987, until November 25, for a power machine for crimping, corrugating, flanging, beading, etc., for Norfolk.

Until December 2, schedule 5992, for one sensitive bench drill, one two-wheel motor-driven emery bench grinder, one motor-driven bench buffing lathe, one motor-driven tool makers' engine lathe, one universal 1½-A milling machine and one compound leverage mandrel arbor press, all for Mare Island; schedule 5996, for one steam-driven air compressor, one double-acting simplex air pump with spare parts, one circulating pump and spare parts, and four No. 00 steel air receivers, all for Mare Island.

Until December 9 for one automatic saw sharpener, one sensitive drill, one auto plug machine, one molding machine, one power bending machine, one bandsaw, one power hacksaw, one punch and shear and one vertical shaper, all for Charleston.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, on November 4, for furnishing supplies for the navy yards as follows:

Schedule 5886—Construction and Repair.

Class 11—Mare Island—one steering engine, American Engineering Company, \$4485; Hyde Windlass Company, \$5194; Lidgerwood Mfg. Company, \$5780.90.

Class 11, Alternate, one steering engine, delivery f.o.b. works. American Engineering Company, \$4000; Hyde Windlass Company, \$4894.

The following bids were received by the lighthouse inspector, fourth district, Philadelphia, Pa., October 4, for furnishing the lighthouse tender Iris with one centrifugal circulating pump:

The Griscom-Russell Co., \$375; Morris Machine Works, \$375, accepted; Lee, S. Harris, \$440; alternate bid, \$390; Fairbanks Company, \$725; Alberger Pump & Condenser Company, \$1060; alternate bids, \$944, \$880 and \$692.

The clamp of the Never Slip Safety Clamp Company, 141 Broadway, New York City, has been admitted to the list of exhibits at the American Museum of Safety. This clamp is employed for lifting horizontal or vertical plates and I-beams, the vertical clamp having been illustrated in *The Iron Age* December 5, 1912. The horizontal clamp, which was the first to be placed on the market, has been recently re-designed and strengthened. The clamp consists of but two parts, a hook and a lever. The bearing surface of the latter member has been made an involute of a circle with a resulting increase in the holding power. Three sizes of horizontal clamp are built for lifting sheets up to a maximum of 2 in. thick, where the load is not over 12 tons.

The C. O. Bartlett & Snow Company, Cleveland, Ohio, has recently taken numerous orders, of which the following are the most important: Plate conveyors and coal and ash handling apparatus, with automatic skips, for the boilers and gas producers for the new plant of the Ohio Steel Company, Cleveland; coal crushing and pulverizing machinery for the plant of the Semet-Solvay Company in Cleveland, that is operated in connection with the Cleveland Furnace Company; automatic ash hoist for the Lackawanna Steel Company; three automatic coal, ore and limestone skip hoists for the Minnesota Steel Company, Duluth. The company is now erecting a coal and ash handling plant, with automatic skips, for the American Rolling Mill Company, Middletown, Ohio.

The Imperial Metal Products Corporation is erecting a plant at Keene, N. H., for the manufacture of metal furniture and building material under the patents of S. C. Entwistle, its general manager. The main building will be 61 x 255 ft., four stories, with an annex 18 x 60 ft., also four stories, of brick and steel construction. The annex will be used for elevators, stairs and lavatories. The equipment will be electrically operated, the current being obtained from a hydroelectric plant in the vicinity. A boiler plant, however, will be erected for the purpose of providing steam for heating the building and japanning ovens. The company was recently incorporated under the laws of Delaware with a capital stock of \$500,000.

The C. & G. Cooper Company, Mt. Vernon, Ohio, is installing three 21½ x 42 in. twin tandem gas engines for the Quapaw Gas Company at its new pumping station at Bigheart, Oklahoma, also three engines of the same size and type for the Southern California Gas Company, at Taft, Cal. The Cooper Company has built over 11,000 hp. of large gas engines this year.

The Ludlow Valve Mfg. Company, Troy, N. Y., has received a large order, aggregating about six carloads, for oil-pipe line valves to be shipped to Roumania to be used in the oil-pipe line to be laid between Baicoi and Constantza, a distance of 175 miles. The valves ordered range from 5 to 12 in. and are required to sustain a pressure of 1200 to 1600 lb. per sq. in.

